

# THE CONDOR

A Bi-monthly Magazine of  
Western Ornithology

*Published by the*  
COOPER ORNITHOLOGICAL CLUB

VOLUME XLI



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# THE CONDOR

A Magazine of Western  
Ornithology



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COOPER ORNITHOLOGICAL CLUB

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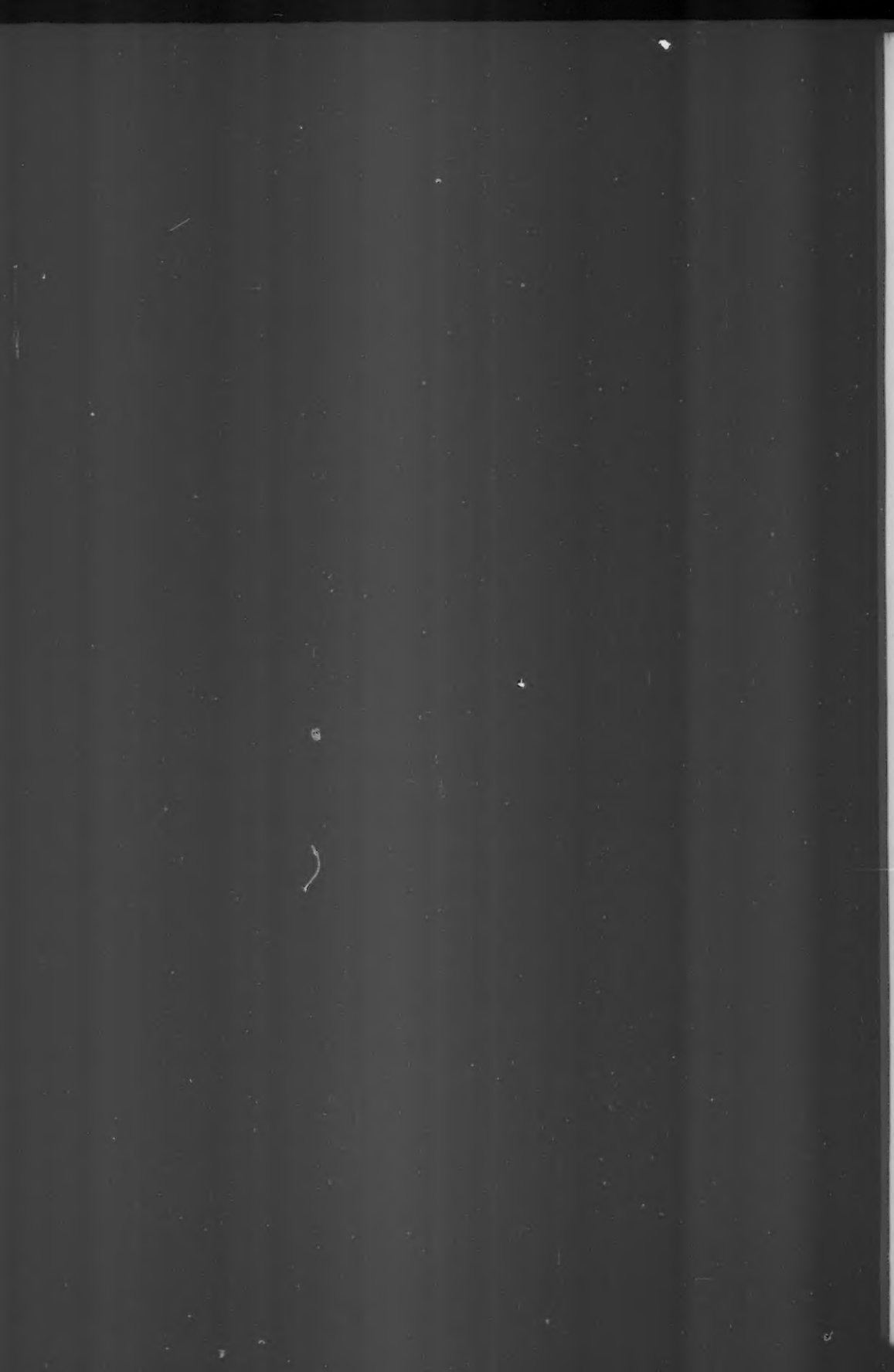
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## THE CONDOR

VOLUME XLI

JANUARY-FEBRUARY, 1939

NUMBER 1

## BEHAVIOR OF THE SAW-WHET OWL ON ITS NESTING GROUNDS

WITH FOUR ILLUSTRATIONS

By RICHARD SANTEE and WILLIAM GRANFIELD

In the spring of 1937 a pair of Saw-whet Owls (*Cryptoglaux acadica*) occupied a nest-box placed by the authors in the Spring Valley game refuge, San Mateo County, California. Four of the set of six eggs hatched and the female and four young were later banded, as was related in an article already published (Granfield, Condor, vol. 39, 1937, p. 185). In order to provide nesting facilities for any other Saw-whets that might be in the neighborhood, we put up several more boxes in the autumn of 1937. During the winter, two of the boxes were used as sleeping quarters by Red-shafted Flickers, and a Screech Owl moved into the box in the live oak in which the Saw-whets had nested. Other boxes intended for Saw-whet Owls were occupied by white-footed mice (*Peromyscus* sp.), their principal prey, but nothing was seen of the owls themselves.

On April 3, 1938, we found the first of our two pairs of Saw-whet tenants of the year. The female of this pair later proved to be the same one (band no. 37-501436) which had nested in our 1937 box, but this time she had chosen a box about a third of a mile from the previous one. This box is located about 22 feet from the ground in a large valley oak situated in a small glen where live oaks, redwoods, and madrones are the principal trees, interspersed with patches of grass and brush. It is a secluded and protected area, abounding in wild life, and several other birds nested near the home of the owls.

Many other amateur ornithologists accompanied us on our visits to the owls and helped us in one way or another, among them Claude Hall, Miss Barbara Norris, Bob Folsom, and Bill Stearman. To Superintendent George Davis and Patrolman James Hourigan of the San Francisco Water Department we owe thanks for their interest and for allowing us to be on the property at night.

About 3 o'clock in the afternoon of April 3 we arrived at the tree in which the nest-box is located and climbed to the box without seeing anything to indicate that it might be occupied. However, when we opened the roof we felt well rewarded, for there, in a corner of the box, was a Saw-whet Owl blinking up at us defiantly. Whether or not it was brooding eggs at this time we did not determine for fear of causing it to desert. Scattered about in the box were five white-footed mice, all with their heads eaten off, and a few gray wing feathers of a small bird. During the time we observed the nest the owl remained motionless, snapping its bill until we closed the roof.

Returning on April 16, we again climbed to the box without seeing the owl. On looking in, however, we found the bird occupying the opposite corner of the nest, and since it appeared to be brooding, one of us reached in to determine if there were eggs. At this the owl backed away, striking upward with its talons and at the same time disclosing five white eggs. This action also revealed a band on its right leg, the first indication to us that it was the same female which had occupied our box the previous

season. The house contained feathers of several small birds (among them the tail feathers of a Vigors Wren), along with a freshly killed white-footed mouse and the tails of other mice.

On April 23 the female was again present, sitting on the five eggs, with the headless remains of two white-footed mice by her side. When a hand was reached in to obtain a mouse for a specimen she snapped at it vigorously, watching it intently and slightly rising from the eggs. Finally, when the hand was but two or three inches from her, she hopped to the edge of the box top, paused there with her back to the observer who was but a foot away, and then flew into the lower branches of a nearby oak. Her actions in this case seem characteristic of the species, for even at night the owls showed no fear of us and would usually not move except to get out of our way. The nest was still quite clean, there being no pellets or droppings in sight.



Fig 1. Nest-box in a valley oak occupied by Saw-whet Owls in 1938. Spring Valley, San Mateo County, California.

When the box was visited on April 30, it was found that two of the eggs had hatched. We lifted the female from the nest and verified the band number, noting also the large bare area on the breast, the "brood patch," which at this season distinguishes her from the male. The usual store of white-footed mice was present, this time the hind parts of three. Before leaving, we replaced the mother owl in the box, where she remained.

As we approached the nest tree on May 15, the female appeared at the entrance of the box and remained there until one of us had climbed within two feet of her. Thereupon she flew out, alighting first in a bush below the house and later flying into a live oak. All five of the eggs had hatched; the two oldest of the young owls were now two

weeks old. The others were noticeably smaller, but all showed pin-feathers coming out through the natal down.



Fig. 2. Female Saw-whet Owl in nest-box with eggs; April 11, 1938.

By May 19 the young owls were sufficiently well grown to require frequent feeding, so we decided to spend a night under the tree to watch the parents bring food; then, after learning something of their habits, we would try photographing them at the nest-box. Accordingly, we set out on the evening of May 19, equipped with sleeping bags, flashlights, and notebook, not knowing quite what to expect. Though it was just dusk when we arrived, a clear, tremulous call drifted down to us from the ridge to the west, and this we rightly attributed to the Saw-whet. The call consists of a single syllable, *quōō'-ik*, repeated at regular intervals, but increasing in rate and rising in pitch as the bird nears the nest. The call has an eerie yet pleasant quality that makes one naturally stop to listen to it.

The calling bird must have been the male, since the female was in the nest when we arrived, and she stayed in it most of the night. Though the moon did not rise until 10:30, there was light enough so that we could be reasonably sure of our observations. Our notes give the following account of the owls' activities.

7:48. The female appeared at the entrance of the box when the light was shone on it.

8:00. Male called at intervals from the hillside about 100 yards away.

8:06. Continuing to call softly, the male flew to the nest tree and perched about fifteen feet from the box. Then he flew to the entrance for an instant while calling more rapidly; but our presence must have frightened him for he returned to his perch.

8:08. Male continued giving an inquisitive *quôô'-ik* call at intervals. He made another attempt to fly to the box but again turned back.

8:11. This time when the male flew to the entrance of the box he remained there several seconds and then flew away. (Probably passed in food.)

8:15. Young owls kept up an almost continual "buzzing" noise, and also "peeped" much like baby chicks. Female apparently was still in the nest.

8:40. Female left the nest-box, flying away silently.

8:47. An old bird (probably the female) flew over us and into the nest without calling, and the young made the "peeping" noise.

8:49. The adult bird was looking out of the entrance when we approached and shone the light at the box.

8:55. It backed into the box again. Young occasionally "peeped"—otherwise all was quiet.

9:13. The male came and called in a nearby tree, then flew to the box for an instant and passed in food. The young kept up a continual chorus of noises.

9:22. Screech Owl was hooting nearby. Occasional noises heard from the box.

10:00. Male called twice from a distance, then twice a little nearer. An instant later he flew to the box, evidently with food, paused there a moment and then flew away. The young owls in the box were quite noisy after he left.

10:38. Calling as before, the male came to the box, this time being answered by one of the young before he passed in the prey and departed.

11:53. In the moonlight the male could be plainly seen as he brought food to the nest. He called twice from a distance, then continued calling from a dead willow about 40 feet away before flying directly to the box. The prey, carried in his talons, appeared to be a mouse.

12:47. When a noise was made on the ground beneath the box, the female jumped to the entrance and looked down at us. She did not seem to mind the beam of light directed at her.

1:04. The female, evidently having left the nest after looking out at 12:47, returned noiselessly.

2:03. Male called faintly from a distance and the young owls replied with a chorus of noises. He flew into the nest tree, called again, and flew to the nest box but did not land. A moment later he tried again, and when the light was flashed on he could be seen clinging to the entrance carrying a mouse. Returning in a few minutes, he succeeded in passing in the food. Young were noisy for a few minutes and then quieted down.

From this time on, no owl entered or left the box although it remained dark until about 3:30. Several times during the night the stillness was broken by birds other than the owls. A Dusky Poor-will called 307 times without stopping, and a Western Flycatcher, a Spotted Towhee, and a Chipping Sparrow were also heard. We climbed to the box at 6:20 that morning; the female owl appeared at the entrance and remained there for about three minutes. We attempted to take her picture and succeeded in getting the camera within 16 inches of her, but she soon lost interest in our actions and dropped back into the box. When the roof was opened she stared up at us, protecting the five young. Two half-eaten mice were in the box.

The following day we nailed our photographic equipment, consisting of a box to hold the camera and a reflector for the flashlight bulb, to a limb 20 inches from the nest box. On this visit the female was not in the nest, and from then on she was not seen at all in the daytime. On the evening of May 22 we returned and set the camera in place, attaching a long lamp cord to the flash bulb so that it could be set off from the ground. At 7:32 p.m. it was still fairly light, and other birds were still moving about when a Saw-whet started calling from a nearby redwood. For several reasons we are quite certain that it was the female that came to the box from this direction, while the male continued to approach from the west. The female (assuming that it was she) then flew low over the ground and, after perching to call some more, flew to the house and deposited the food. It was surprising to us that the owl had caught a mouse so early, and that the small birds paid no attention to her as she came to the nest. Between this visit

and midnight the young were fed at 8:26, 9:45, and 11:38; photographs were taken of the last two feedings.

On May 25 we spent a part of the night trying to get more pictures. This time we waited beneath the redwood tree and at 7:38 p.m., only five minutes later than her



Fig. 3. Flashlight photograph of Saw-whet Owl carrying a white-footed mouse into the nest-box. Tail of mouse shows below feet of owl. The landing below the entrance was not used by the owls.

previous appearance, the female flew into the tree with a mouse in her talons. At 8:05 an adult came to the box from the direction in which the male usually approached, and from then until 12:40 we recorded five more visits. It was necessary to climb the tree after each picture to reset the camera; at 10:55 as one of us was doing this, the light happened to shine on a half-dead coyote-bush beneath the house. To our surprise we

saw the female owl sitting there, turning her head back and forth as if unable to look into the light for any length of time. We could see the band on her leg and noted that she carried no food before she flew off. A few minutes later, when the climber was near the nest, she returned and flew at him, striking him on the head three times. She did no damage, but nevertheless it was decidedly uncomfortable to be struck in the dark with no warning.

Our last nocturnal visit was on May 28 when again the female was heard calling from the redwood promptly at 7:37 p.m. One of the young appeared at the entrance, and the female then flew to the nest tree with a mouse in her talons and perched near the box. Picking up the mouse in her bill, she flew with it to the young owl who seized



Fig 4. The four young owls (one partly covered) and two infertile eggs of the 1937 nest; also, remains of two mice.

Photograph by Robert Barth.

it and disappeared inside the box. The old birds brought food only twice during the succeeding five hours that we watched, probably due to the fact that the female remained in the vicinity of the nest to dive at us every time we climbed the tree. By June 2 all but two of the young owls had left the nest and these, too, were gone when we returned to clean out the box on June 11. From the time the young had hatched no evidence of prey other than white-footed mice had been seen in the box, but on this occasion the remains of a field mouse were noticed.

Naturally believing that we had seen the last of the Saw-whets for that season, we were making a final check-up of the other boxes on June 11, when the second nest was discovered in a box about a half mile away. This one is approximately 35 feet above the

ground in a tall Douglas fir near the lake shore and had been unoccupied on our previous visits. As we opened the roof, the female jumped to the entrance where she was caught and banded. There were four eggs in the box. Some moss, scattered about in the sawdust on the floor, indicated that a mouse or small bird may have started a nest there.

The next visit was on June 17 and this time the female flew out of the box as we were about to look in. Another egg had since been laid and it was interesting to note that the floor was covered with dead red ants, evidently killed by the owl when they ran into the nest. Again, on June 25, the female flew out of the box, perching about eight feet away in the sunlight. As we approached to take her picture she flew down to a buckeye tree where a group of birds started scolding her. A few minutes later, when we had climbed down and were on the point of leaving, she flew back into the nest tree followed by the other birds and then disappeared into the box. On that visit and on the previous one there were two dead white-footed mice in the nest.

On July 8 a blind was placed several feet from the nest; the female left the box, watching us from a nearby branch for about 15 minutes before flying off. The next evening when we returned, the female was caught on the eggs, but during two and a half hours of watching no owl was seen to enter or leave the nest. Incidentally, two owls that appeared to be adult Saw-whets were seen on the dirt road that night about two miles from this house. Although the female was still incubating the eggs on July 17, it was apparent that something was wrong, because the other sets had taken less than a month to hatch. Two days later the female was gone, so the eggs were removed and given to the Museum of Vertebrate Zoology, Berkeley. When they were "blown," it was found that none of the eggs contained embryos and therefore it appears that the female had been incubating an infertile set.

Thus was our experience with these interesting birds ended for 1938. We might add that eleven other species of birds have used our nest-boxes and at least 40 of the boxes were occupied this year.

*Summary.*—During 1937 and 1938 a study was made of three nests of the Saw-whet Owl at Spring Valley Lakes, San Mateo County, California. The female of the 1937 pair was banded, and she nested in a different box in 1938. A second female nested unsuccessfully about a half-mile away and approximately nine weeks later. The nest-boxes were of different types and were located in different kinds of trees.

The number of eggs per set was six, five, and five. Only the female was observed to incubate. She stayed in the nest with the young during the day, and also during most of the night until the young were fully feathered.

The food consisted almost entirely of white-footed mice, and during one night at least seven mice were brought to the young owls. A store of extra mice was almost always found in the nest.

The adults called repeatedly when bringing food and usually dropped the prey into the box while clinging to the entrance. The female in each case was quite fearless and one of them would strike intruders at night. Young owls were in the nest more than four weeks. Their plumage differed markedly from the adult plumage.

*San Mateo, California, September 21, 1938.*

## THE WESTERN MOCKINGBIRD IN THE SACRAMENTO VALLEY

WITH TWO ILLUSTRATIONS

By LLOYD G. INGLES

In his paper on the changing distribution of the Western Mockingbird (*Mimus polyglottos leucopterus*) in California, Arnold (Condor, vol. 37, 1935, pp. 193ff) states that its breeding range in the San Joaquin Valley extends from "north central San Joaquin County, on the north, to south of Bakersfield." In the Sacramento Valley the same author believes the area "about Sacramento seems to be an extension of the breeding territory at the north end of the San Joaquin Valley, while the area about Davis, Yolo County, in which the mockingbird was first reported nesting in 1928 (Storer MS, 1933), seems to constitute a distinct area of residence, without any connection, at the present time, at least, with any other areas." It is pointed out that Marysville, Yuba County, may be a breeding area but that no records of nests have been reported since 1890 (Belding, Land Birds Pac. Dist., Calif. Acad. Sci., Occ. Papers 2, 1890, p. 226).

The present writer first noted the presence of mockingbirds about his newly established residence near Durham, Butte County, during the winter months of 1932-33. On this ranch they have occurred every year since that time during the months of November, December, January, February and March. During this time they drive away nearly all other species of birds from shrubbery which has ripe fruit, particularly from the Oregon grape, Virginia creeper, pyracantha and varieties of climbing roses. The birds usually seem to leave the region about the first of March, although on another ranch about a mile away a singing bird was daily observed by the writer during most of the months of April and May, 1937. This bird sang almost hourly during the day and often on moonlight nights from the top of an old barn and from the cross-arm of a power pole. Hours were spent in searching, but no nest was ever discovered.

During the spring of 1937 a student in the writer's ornithology class insisted that mockingbirds had been nesting in Corning, Tehama County, for many years. A trip to Corning during the first week of June, 1937, resulted in numerous birds being observed about the residence district of that town and about the surrounding olive orchards, but no occupied nests were found. A citizen of Willows, Glenn County, reported mockingbirds nesting at his residence since 1934.

In May, 1938, the writer decided to investigate the mockingbird problem by visiting the areas where they had been reported by his students. Near Sutter, Sutter County, on the Meischke Ranch, he was shown a vacated nest which was occupied until the previous day by three young birds. The nest was collected. Another nest containing one mockingbird egg was located in a pyracantha shrub. The egg was collected. A mockingbird was singing at the time and another resented vociferously the intrusion and the taking of the egg. Mockingbirds have been reported by Mr. Meischke, the owner of the ranch, to have nested there since 1932, and the writer was shown the remains of several old nests still in their original places which were usually in thick pyracantha shrubs.

In the vicinities of Durham and Chico, Butte County, no mockingbirds were seen during this trip, although the places visited in these communities usually were occupied during the winter months. Between the Sacramento River and the town of Orland, Glenn County, two mockingbirds were observed singing from the tops of power poles about a mile apart. No stops were made to look for nests until the town of Corning, Tehama County, was reached, although three other roadside observation records of singing birds were made between Orland and Corning. In the last named town two

mockingbirds were seen in the garden on the grounds of the Maywood Hotel. One of these carried two green caterpillars and the other sang from the top of a cypress tree.



Fig. 5. Nest of Western Mockingbird in an olive tree at Corning, Tehama County, California, May 14, 1938.

A nest was soon located in the top of a rose trellis about eight feet from the ground. One of the birds protected the nest and on several occasions struck the writer on the head and shoulders as he investigated it. Later, it was learned that even the nocturnal promenading guests at the hotel had similar treatment administered by this same bird. The nest contained three half-grown young. A ladder was obtained and after tying back a few branches, the nest and young were photographed *in situ*. The protesting parent was then photographed at a distance of less than three feet. The manager of the hotel stated that when the garden was planted "fourteen years ago there were no mockingbirds present," but in "recent years they are everywhere about Corning." These statements were corroborated by other residents of the town and were found to be true as regards present conditions; for not only was another nest containing five eggs located a few blocks away, but seven other birds were observed singing from high places in the residence district. The nest containing the five eggs was photographed and the writer was given permission to collect one of them. It was situated about ten feet from the ground in the very bushy tips of an olive tree in the back yard of a residence on Yolo Street.

All of the nests observed are constructed on the same plan. The outer framework

consists of rather coarse sticks loosely arranged. Enclosed by this bulky material is a layer made up largely of grasses, string, rags, and wool. The innermost layer or lining in every case was made up of tiny rootlets. The nests were all placed in brushy protected places.



Fig. 6. Western Mockingbird defending its nest.  
Photograph taken at Corning, Tehama County,  
May 14, 1938.

Just why the Western Mockingbird has not yet extended its breeding range north of Yuba and Sutter counties on the east side of the Sacramento River, at least to the level of Corning on the west side, is not known. Arnold (1935) has pointed out that no single factor will account for the distribution or changing distribution of this species. The areas where the above-mentioned nests were located are to all appearances drier, and the vegetation grows less luxuriantly, than is found to be the case on the valley floor east of the river and north of Sutter and Yuba counties. The east side of the Sacramento River in this area has a very high water table and about thirty per cent more rainfall than the west side. It supports such vegetation as valley oak, almond, prune, and peach orchards, as well as thousands of acres of flooded rice fields. The mockingbird area west of the river is drier and supports such vegetation as olive and orange groves. Apparently the mockingbirds at present spread to the east side of the river only to feed on the winter fruits but leave it again when the breeding season approaches and build their nests on the less humid west side. This suggested difference in moisture in the air and the soil for these two areas may, of course, have no direct bearing on the distribution of this species in the Sacramento Valley, but may conceivably affect the ecological niche of the bird by affecting its food supply, by increasing or decreasing its enemies and competing species of other birds, and in the selection of nesting sites. The last-named factor, however, seems less important, because the pyracantha and rose bushes, the favorite nesting places of the Western Mockingbird in the Sacramento Valley, are not limited to its present breeding range. Indeed, these plants grow equally well on both sides of the Sacramento River.

*Chico State College, Chico, California, May 16, 1938.*

## FUNCTIONAL ASPECTS OF THE PNEUMATIC SYSTEM OF THE CALIFORNIA BROWN PELICAN

WITH THREE ILLUSTRATIONS

By FRANK RICHARDSON

This paper discusses the pneumatic system of the California Brown Pelican (*Pelecanus occidentalis californicus*). The system is of peculiar interest in the pelican because it is involved in this bird's striking adaptations for its special mode of feeding.

The term pneumatic system is used to include the air cavities in the bones and the complex series of small interconnected air cells between the skin and the muscular surface of the body. The internal air-sacs apparently have functions both in respiration and in a more purely pneumatic sense, although their functions may vary in different birds. Consequently, it is probably better to consider the internal air-sacs according to their function rather than to try to draw an arbitrary line between pneumatic and respiratory systems. Although I have here dealt primarily with the pneumatic system, the respiratory system is necessarily involved where the two systems have common

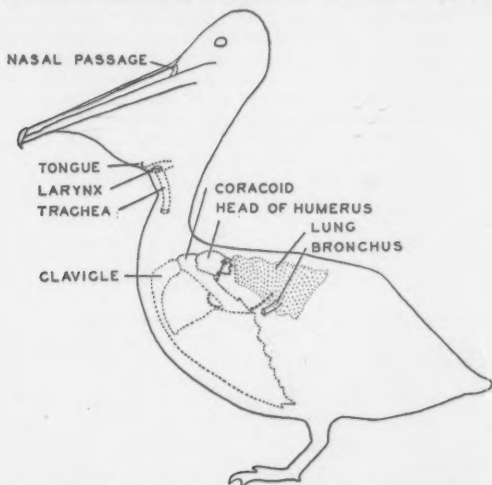


Fig 7. Outline of pelican showing location of certain parts of respiratory system. Heavy dotted line marks approximate course of air from lung to superficial air mattress.

passages, such as the nasal passages, trachea, and bronchi. The discussion in this paper traces the passage of air from its intake to its arrival in the superficial pneumatic system (see fig. 7), and concludes with a consideration of function.

The following account is based on dissection of two specimens only. With this limitation in mind, an attempt has been made to draw conclusions of a general nature not based on small and possibly variable anatomic details. The method of study has been the dissection of both freshly killed and preserved specimens, as well as observation of living birds. The most helpful adjunct to this method has been the blowing of air through the respiratory and pneumatic systems by means of a tube inserted into the trachea.

I gratefully acknowledge the stimulus of Dr. Loye H. Miller of the University of California at Los Angeles, under whom most of this work was done, and the advice of Dr. Alden H. Miller of the University of California at Berkeley in preparing this report.

**External nares.**—Macgillivray (A history of British birds, vol. 5, 1852, p. 378), Balthasar (Zeitschr. Anat. u. Entwickel., vol. 104, 1935, p. 614), and others have pointed out the usual complete closing of the external nares in cormorants. Owen (Proc. Zool. Soc. London, 1835, p. 9) mentioned this closure as being virtually complete in the pelican. Dissection disclosed the external bony opening to be effectively blocked by a flap of horny skin coming down from above. The close binding of this skin to the underlying bone and the lack of any skin muscles in this immediate region seem to preclude control of the opening of the external nares. It seems true, however, that though these horny flaps would effectively prevent appreciable ingress of water or air, their effect would be much less marked on the expulsion of air.

**Internal nares.**—The internal nares, though reduced to a slit approximately ten millimeters long, are not closed. Slight contraction of large muscles (*M. pterygoideus internus*) running along the sides of this slit probably could completely close it. However, a small amount of air under pressure could be blown into the internal nares and out the external, and it seems likely that though the nasal passage has lost its primary respiratory function, it can still be used to a very limited degree. Possible reasons for this loss of use are considered in an ensuing paragraph.

**Larynx.**—The extremely small size of the tongue and hyoid apparatus of the pelican has been mentioned or figured by various early anatomists, as for example Gadow and Selenka (Vögel, Anatomischer Theil, Bronn's Thier-reichs, vol. 6, 1891, p. 664 and fig. 41). The muscles causing contraction of the pouch, essential in straining water from the pouch when it contains fish, have been further studied by Kühnau (Anat. Anzeig., vol. 73, 1932, p. 322). The strong development of laryngeal muscles emphasizes the necessity of a strong and tight closure of the glottis to prevent the entrance of water which often fills the pouch and covers the larynx. Moreover, a pocket-like fold of skin, opening into the pouch, was found on both of the opposing edges of the glottis. These folds, because of their valve-like nature, insure a perfect exclusion of water from the trachea. Their pockets would catch any water entering the glottis, but allow passage of air leaving the glottis. Such valves were not found in the Brown Booby (*Sula leucogaster*), a pelicaniform bird with comparable diving habits but without a pouch.

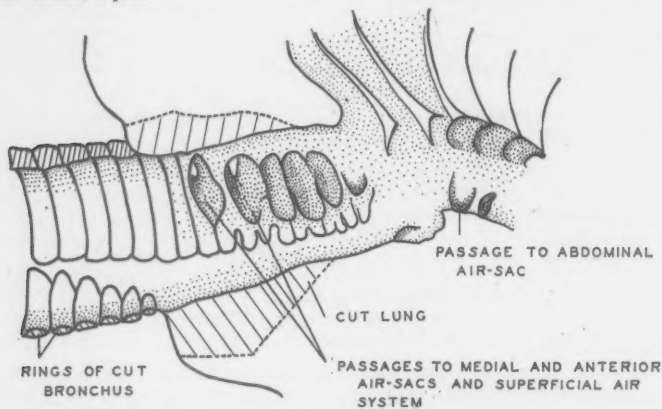


Fig 8. Left lung of pelican opened from lateral side to show entrance of bronchus into lung and passages to air-sacs.

Although the closing of the external nares is probably correlated with the pelican's surface plunging, the disuse of the nasal passage may be accounted for in part by other feeding adaptations, especially the great development of the pouch and the consequent wide separation of the larynx from the internal nares. Also, reduction of the internal nares may again be due to the need of excluding water from the nasal passage.

**Bronchi and lungs.**—The bronchi enter the ventromedial edges of the lungs. The semi-ring

structure of each bronchus is continued, though becoming less and less complete, some two centimeters into the lung itself. Several large medial air passages are given off before the bronchus has penetrated even one centimeter (see fig. 8). These passages, the first to be given off, lead directly to air cavities chiefly anterior and medial to the lungs, which in turn lead to the superficial air system. The main air passage from each bronchus is through the lung to its outer surface and is there divided into superficial air passages covering over half of the outer surface of the lung but not leading to the ostia of the air-sacs. A direct but deeper passage (fig. 8) leads to the abdominal air-sacs.

*Internal air-sacs.*—The present study has made no direct contribution toward a more complete understanding of the rôle of air-sacs in respiration. However, dissections and artificial inflations have suggested another, though possibly incidental, function of the air-sacs of most birds, namely, the maintenance of body contours and the compensation for changes in size or position of the viscera. The maintenance of these contours is essential to most perfect flight. The feathers themselves are probably arranged and held most effectively in flight, and serve best as an insulating mat, when the skin beneath them is normally rounded out by underlying air cavities, as it may be especially in the abdominal region.

*Superficial air cavities.*—The superficial air mattress of the pelican is strikingly developed on all of the bird's ventral surface, including the neck and feathered parts of the head and extending out the wing even to the tip of the second digit. The only passage to this system of small interconnecting air cavities from an internal air-sac, and thus indirectly from the lungs, was found in the region just posterolateral to the head of the coracoid and below the head of the humerus (fig. 7). This passage is primarily between the *M. coracobrachialis posterior* and the *M. subcoracoideus*, following the nomenclature of Gadow (*op. cit.*, p. 211) and Howell (Auk, vol. 54, 1937, p. 374), and probably corresponds to the axillary diverticulum of an interclavicular air-sac figured by Müller (Smiths. Misc. Coll., vol. 50, 1908, fig. 11) in the pigeon. This sac is supplied with air fairly directly from the two medial ostia of the lung. These ostia receive air from the first two passages leaving the bronchus immediately after its penetration of the lung. After emerging between the above-mentioned muscles, the air passage continues over the ventral humeral head, past the pneumatic foramen and just medial to the insertion of the *M. triceps*, and then turns dorsally to pass under (medial to) the inserting tendon of the *M. pectoralis* before connecting with the superficial air cavities. These cavities thus receive air from the lungs rather directly, and probably by the above-mentioned passage only. This is also indicated by the frequently reported ability of a bird with a broken wing, especially if broken along the humerus, to continue breathing even though the trachea is closed. Breathing in this case may be primarily through the humerus itself, typically pneumatic in birds, especially since the primary pneumatic foramen of the humerus is located at a point along the passage to the superficial air system. Breathing could also be by way of superficial air cavities along the wing.

The above-mentioned passage for air from internal air-sacs to superficial ones has been found in just the same position in other birds. Gurney (The Gannet, 1913, p. 523) quoting C. B. Ticehurst on the gannet states: "... Entrance (from within) to the large subcutaneous air-sacs is just outside the coracoid and close to the tendon of the *pectoralis minor* [*M. coracobrachialis posterior*], between that tendon and the nerves and vessels which supply the pectorals." Groebels (Der Vogel, vol. 1, 1932, p. 58) implies that the presence of a *Diverticulum humeri* coming from the *Diverticulum axillare* of the interclavicular air-sacs is the usual condition in birds. The passage to the skin is apparently just a continuation of this route to the pneumatic foramen of the humerus.

Although there is just the one way for air to reach the superficial system from the lungs, there is sometimes a connection between the air cavities of the pharyngonasal system of the head region and the pulmonary cavities of the neck. Stresemann (Aves, in Kukenenthal Handbuch der Zool., vol. 7, 1927-1934, p. 180) mentions that such a connection exists in only a few birds, including *Pelecanus* and *Sula*. In the present study only a very small amount of air could, by forceful lung pressure, be blown from the nasal passage of the pelican to the air mattress on the side of the neck just behind the head. This small amount of air does not seem significant, as the living bird would have no way, apparently, of forcing air in this way and could lose only very little through this channel.

*Degree of inflation.*—The term inflation is here used to denote the filling of the superficial air system. Actually the filling of internal air cavities, especially in the abdominal region, causes an initial but more limited visible inflation of the pelican. Figure 9 shows the degree of inflation possible under human lung pressure. Probably this inflation does not exceed that which may normally take place in the pelican, as inflation is limited to regions that for anatomical reasons permit it. This striking inflation was discovered by early workers. Milne-Edwards (Ann. Sci. Nat., Zool., ser. 5, vol.

3, 1865, p. 140) tells of an experiment to show the buoyancy of the inflated pelican in which a bird weighing 4.15 kg. was able to hold up 10.5 kg. without sinking. Assuming such an extensive inflation to be normal under certain conditions, we must, since air



Fig. 9. Outlines of pelican showing degree of inflation. Dotted line, deflated bird; solid line, same bird inflated by human lung pressure. Outlines traced from photographs.

soon leaves the superficial air system when the pressure forcing it in is released, explain both the attainment and maintenance of such inflation.

Maintenance seems adequately explained by the tight and strong closure of the glottis. Attainment, that is, the problem of forcing air into the very large total space (considerably larger than the volume of the combined internal cavities alone) of the superficial air cavities, is not easily explained. Gurney (*op. cit.*, pp. 525-526) assumes that in the gannet the superficial air system can be filled by inhalation when flying (but not when standing), but offers no explanation. Though the present study cannot decide this question, a possible explanation is suggested, namely, that inflation is attained by a series of abdominal contractions which force air from the large abdominal air-sacs, each expulsion of air taking place while the glottis is closed. Thus air is forced to the superficial system since it is the only alternative space. Each expulsion would be followed by quick inhalation of air through the glottis. Such inhalation would be possible since air leaves the inflated superficial air cavities, after pressure is removed, much more slowly than air is inhaled through the glottis.

Observation of living pelicans has not proved just when inflation does occur, as differences in size cannot well be judged. However, plunging pelicans have never been seen to go more than partly below the surface. In fact they typically hit the water very heavily, only to float very high almost at once. This indicates inflation before the dive and suggests that inflation is a protection to the bird in striking the water. This correlation of a well developed superficial air mattress in peleciform birds with the habit of plunging for food has been mentioned by Stresemann (*op. cit.*, p. 801). He states that the booby and tropic-bird, which are plungers, are alike in the highly developed pneumaticity of the skin, and that this is an adaptation which lessens the force of the impact with the water. He further states that this adaptation is also found in the pelicans, though less marked, where plunging is again encountered, and that in contrast to this the pneumaticity of the true divers, *Phalacrocorax* and *Anhinga*, is greatly reduced. (See also Macgillivray, *op. cit.*, p. 419.) The validity of this correlation is borne out by a comparison of the California Brown Pelican and Brandt Cormorant. Superficial air cavities are little developed in this latter, deep-diving bird.

Other explanations have been offered for the pneumaticity of the pelican. It was once thought that the pelican is especially pneumatic to help it carry heavy loads in its pouch! The suggestion that such pneumaticity gives a desirable buoyancy in the water seems entirely possible, however, and need not negate the validity of the correlation of plunging with pneumaticity.

It should be emphasized that the above conclusions or inferences should be applied only with much caution to birds other than pelicans. The skin of the screamers

(Anhimidae), for instance, is highly pneumatic and although the reason for this is unknown, it certainly is not the one that holds for the pelican. In the light of this present study, then, the desirability of considering the parts of the respiratory and pneumatic systems in adaptation to different living habits becomes apparent.

*Berkeley, California, November 24, 1938.*

## OBSERVATIONS ON THE NESTING OF THE ALLEN HUMMINGBIRD

WITH FOUR ILLUSTRATIONS

By ROBERT T. ORR

The Allen Hummingbird (*Selasphorus alleni*) is one of our common summer residents in the San Francisco Bay region, usually arriving before the middle of February and remaining in some numbers until the early part of September. From the first day of the arrival of the species to the end of the nesting season its presence is continually forced to human attention through the noise made in flight, by the shrill sound of the courtship dives, and by the constant noisy clashes of belligerent individuals objecting to intrusions upon one another's territories.

Strangely enough, despite the abundance of this diminutive avian representative, we know surprisingly little concerning its nesting activities and the behavior of the young. For this reason the writer kept rather careful notes on an Allen Hummingbird's nest that was situated within three feet of one of the windows of the California Academy of Sciences in Golden Gate Park, San Francisco, during the summer of 1938.

Allen Hummingbirds were first noted this year on February 15. On this day they were numerous in the vicinity of the Academy buildings and many males were seen and heard diving. By the first week in March at least three different females were seen to make regular trips to a box containing some old cotton placed on the roof of the North American Mammal Hall. Sometimes a skirmish would result when two birds arrived at the same time, but this did not often occur. It was not, however, until after the first broods had been raised that the writer's attention was called to a nest which was nearly completed. The structure was almost finished, with the exception of the inside lining, when first discovered on May 6. It was located on the northeast side of an exotic tree, *Eugenia paniculata*, at a height of 5 feet 3 inches above the ground. The nest was on a terminal twig that was drooping at an angle of approximately 45°. Two smaller twigs branched off above the base of the nest and penetrated the lower, central portion, giving it firm support. The outer part of the nest was formed of plant fiber covered largely with lichens and small strips of bark with moss adhering.

On May 6 the female was regularly seen carrying material to line the inside of the nest. This continued for the ensuing few days. On May 10 some cotton was placed on a window sill not far from the nest and this was also used as lining, in addition to plant down. The first egg was laid some time during the morning of May 11. The second egg was deposited the following morning and incubation began immediately. At 1:00 p.m. on May 12, the female was purposely frightened off the nest in order to photograph it. During the 20 minutes following, while preparations were being made to take the picture, she remained in the immediate vicinity, often within 3 or 4 feet of the writer. Three times during this period she was seen to chase away a male of this species. Within half a minute after the window from which the photographs were taken was closed she returned and settled on the nest.

On the second day of incubation considerable time was devoted to observing the behavior of the female. Feeding took place principally in the morning. Between 9:00 a.m. and 12:00 m. she was not seen to be present on the nest more than 6 minutes at a time and the average time present was 2.8 minutes. The average period of absence was 1.4 minutes and the maximum period of absence 3 minutes. This time was mostly devoted to the securing of nectar from the blossoms of *Eugenia* trees growing near-by. Occasionally, however, a portion of the time was spent perched on a summer lilac bush 15 feet away, preening or at rest. Very often when the female appeared about ready to leave the nest to feed, the presence of another member of the same species in the immediate vicinity seemed sufficient to induce her to depart, although, as will be seen later, toward the end of the incubating period no such reaction was apparent. At such times she would fly straight up from the nest for several feet then take after the intruder, calling as she did so. On several occasions she returned with cottony nesting material in her bill. This was inserted into the cup of the nest.

Although the males are generally conceded not to be present in the nesting territory, a male was seen regularly on a perch 40 feet distant from the nest. This individual was frequently seen to chase other Allen Hummingbirds away from this vicinity. On one occasion the female uttered a single abrupt note when feeding near the male who was on his perch calling.

While continuous observations were not carried on during the afternoon, the nest was examined at least four times an hour between 1:00 and 5:00 p.m. and frequently for 10 or 15 minute periods. At no time was the female seen voluntarily to leave to feed, although once she was disturbed intentionally for photographic purposes for about half an hour. When sunlight, reflected from a mirror, was first focused on her she flew up in alarm; but after this was repeated several times she became accustomed to the bright light and remained settled on the nest.

On the third day of incubation no differences in behavior were apparent. Observations, made during most of the morning between 9:00 a.m. and 12:00 m., showed the female to devote much of this time to feeding. She remained on the nest no longer than 8 minutes at a stretch, averaging 4.1 minutes, and she was absent no longer than 2.5 minutes at any one time, the periods of absence averaging 1.1 minutes. On three different occasions, when the female left the nest, a male was seen to alight on the same perch as was occupied by a male on the previous day. Each time he left almost simultaneously with the return of the female to the nest. Twice this male was seen to make low dives within 20 feet of the incubating female. Once the female was seen to leave the nest and fly at the perching male and scare him away. Another time the female was seen to fly from the nest, right past the perched male. The latter immediately followed her, both birds calling as they flew, but he very shortly lit on another perch while the female disappeared from the observer's view.

The manner in which the female left and returned to the nest was rather constant. On leaving, she would usually rise straight up for several feet, then fly away, calling when she was 10 to 15 feet distant. The call normally given near the nest was a low "chut." On returning she would frequently utter the same note within a foot or so of the nest and not uncommonly after or while settling on the eggs. The nest was almost invariably entered from the same side. The edge of the nest was never perched upon, as the female literally flew onto the eggs. Immediately on alighting, judging from the vibrations of her body, she moved her feet rapidly and made from a quarter to a three-quarter turn. This also moved the eggs. When finally settled she moved her head about frequently, taking note of her surroundings. The presence of a person, however, in the immediate vicinity would cause her to remain perfectly motionless.

Few evident changes in behavior were apparent during subsequent days of incubation, except for a decrease in the number of trips made daily for food. This was correlated with a slight increase in the periods of absence from and presence on the nest. On May 21 the average time spent on the nest in the morning was 7 minutes and the longest time present was 9.5 minutes. The longest period of absence was 3 minutes and the average period of absence 1.6 minutes. At this time the female was rarely induced to leave the nest because of the proximity of other hummingbirds. Once a male hovering close overhead caused her to leave in pursuit. Another time, however, a male hovered over her and then fed from blossoms no more than 2 feet distant without inducing her even to move. Other females in the vicinity, either feeding or flying by, aroused no reaction, nor did a pair that copulated in mid-air within 18 feet of her.

On the evening of May 26 the eggs were as yet unhatched; but when examined at 8:20 the following morning one of the young had emerged. At 9:10 a.m. the female upon returning, after feeding on the nectar of *Eugenia* blossoms in the nest tree, was seen for the first time to perch on the rim of the nest. She then probed her bill into the lower part of the cup, but from the observer's position it was impossible to see if she was feeding the newly hatched young, moving the remaining egg, or merely adjusting the lining of the nest.

At 2:30 p.m. the second young was seen emerging from the remaining egg. At 3:07 p.m. the female was flushed and the nest and contents examined. The down of the first hatched young was completely dry and fluffed out, being present in small quantities



Fig. 10. Female Allen Hummingbird brooding young 5 days old; June 1, 1938.

along parts of the spinal tract. The second young was still struggling to free itself of half the shell. The skin of both young was very darkly pigmented. Their eyes were closed and their bills were short, fleshy-yellow in color and did not differ noticeably in shape from those of certain small passerine birds. The inside of the mouth was a brilliant orange-yellow. During the afternoon the female was seen to remain away for as long as 5 minutes. On returning once she was seen to perch on the rim and extend her bill down into the nest, but from the observer's position it was not possible to determine whether or not she was feeding the young.

According to these observations the period of incubation in this case was a full 15 days. This is a considerably longer incubation period than Dawson (Birds Calif., vol. 2, 1923, p. 928) gives for the Allen Hummingbird. That author states: "Eggs are deposited on alternate days; and incubation, counting from the deposition of the second egg, lasts twelve." It is, however, slightly less than found by Clabaugh (Condor, vol. 38, 1936, p. 176). Mention might also be made of the fact that eggs in this instance were deposited on consecutive rather than alternate days as is the usual custom.

During the first few days the female spent nearly as much time on the nest brooding as she had done previously incubating. By the end of the week, however, there was a noticeable decrease in the brooding as well as a great increase in the amount of time devoted to securing food. By June 8, when the young were 12 days old, brooding had practically ceased. Sometimes, after feeding the young, she would hop onto the nest, but never for more than half a minute. When the young were nearly ready to leave, due to their size it became physically impossible for the female to brood even though she would occasionally make an attempt to do so.

The female, upon returning to feed the young, would usually give several low call notes as she approached the nest. Invariably she perched on the same part of the rim. As a general rule about 5 seconds elapsed before feeding commenced. During this time the young, if hungry, would raise their heads and silently open their mouths. Following this the female would rather rapidly insert her bill into the open mouth of one of the young until the tip of the culmen of the latter almost reached the base of the parent's culmen. Food was then transferred to the young during which time the throat of the female was seen to vibrate rapidly and the young occasionally jerked and yanked at the bill of the adult. Five feedings were usually made each time, although sometimes the number was less, these being given alternately to the two young without favoritism. The first feeding was generally the shortest. The amount of time required for each feeding varied from 5 to 20 seconds, averaging about 10 seconds.

Food was secured by the female principally from the blossoms of *Eugenia*. Small insects were occasionally seen to be captured from the air and probably were taken to a greater extent from cobwebs.

The young maintained a sanitary condition in the nest. Defecation was accomplished by raising the posterior portion of the body to the rim of the nest and forcibly extruding excrement 6 or more inches into the air, clearing the nest, thus in the same manner as this act is accomplished by young raptorial birds.

One of the young was about 2 days in advance of the other, regarding development, up to the time the nest was left. When 6 days old the young were seen to be very darkly pigmented, more so than when hatched. Juvenal feathers had not yet appeared, nor were their eyes open. At this time the female was seen to remain away from the nest for as long as 20 minutes at a stretch. On the 7th day a few feathers were in evidence along the spinal tract, and the primaries and secondaries were seen beneath the surface of the skin on the larger of the young. By late afternoon on the 8th day the rectrices were seen

beneath the surface of the skin, and the remiges were protruding through the skin on this individual. More feathers were likewise seen along the spinal tract as well as the capital, humeral, crural and ventral tracts. No juvenal feathers were in evidence as yet on this date on the smaller of the two young, with the exception of the rectrices and remiges.

On the 9th day the bill of the larger bird was dark along the culmen from base to tip as well as along the sides just above the cutting edge. The area between, however, was dull yellow. The bill of the smaller bird was mostly dull yellow with a small amount of dusky color present along the culmen. The inside of the mouth of both individuals was still a brilliant yellow. The primaries and secondaries of both birds protruded through the skin, but were not as yet through their sheaths. Feathers were apparent on the dorsal body and head tracts of the smaller individual. All of the feather tracts of the larger bird were in evidence on this date and most of those of the spinal tract were one millimeter through their sheaths.

By the 11th day practically all the feathers of the dorsal body tracts of both young were out of their sheaths. Those of the larger individual extended as much as 2.5 milli-



Fig. 11. Young Allen Hummingbirds 12 days old being fed. On this day the eyes of the largest young were seen open for the first time; June 8, 1938.

eters beyond the broken ends of their sheaths. The feathers of the ventral body tracts, the crural tracts and the feather tracts of the head had not yet emerged from their sheaths. The bills of both birds were considerably darker. The smaller of the two had, in most respects, on this date advanced no farther in development than the larger bird

on the 9th day. The parent on this date was noted to remain away from the nest for as long as 27.5 minutes.

On the 12th day the eyes of the larger bird were at times partly opened. The upper mandible was yellowish only at the angle, being dark otherwise. The lower mandible was dark beneath but yellowish along the sides almost to the tip. The culmen measured 4.9 millimeters. The rectrices were just breaking through their sheaths on this date although the primaries and secondaries were already well through. The feathers of the capital tracts were not as yet through their sheaths although those of the crural and ventral tracts were. Growth appeared to take place very rapidly from this time on.

By the 13th day all the feathers, excepting those of the forehead, were through their sheaths on the larger bird. The remiges extended about 2 millimeters beyond the broken ends of their sheaths. The culmen measured 5.8 millimeters. This individual was seen to turn around in the nest a number of times, observe its surroundings and do considerable preening. The smaller bird's eyes were very slightly opened on this day. Its bill was much darker than on the previous day. The remiges were; likewise, just beginning to break their sheaths. On this day the female was noted once to stay away for a 40 minute period.

On the 15th day the young were seen to be much more alert than previously noted. The larger individual kept its eyes open most of the time and when a finger was poked



Fig. 12. Young Allen Hummingbirds 19 days old being fed; June 15, 1938.

near, it would call, giving frequent utterance to a relatively low note until the offending object was withdrawn. A great deal of time was devoted to preening, also to shaking and fluttering the wings. The smaller bird was much more quiet and kept its eyes closed most of the time. The only feathers not yet out of their sheaths on either bird were those on the anterior part of the head just above the base of the culmen.

The 16th day showed both birds to be more active. Only 12 feathers on the forehead of the larger bird were as yet sheathed. The primaries were 7.5 millimeters long from tip of sheath to tip of feather. The upper mandible of both birds was now entirely dark, but the proximal portion of the lower mandible was still partly yellowish.

On the 18th day the female was seen to remain away from the young for as long as 45 minutes. The contour feathers of both young now completely covered their bodies and only a few wisps of natal down still adhered to the feathers of the posterior part of the spinal tract. The culmen of the larger bird measured 9.1 millimeters, its longest primaries 9.7. During the afternoon it became quite warm and the young were seen to keep their mouths open quite a bit. They were keenly observant of their surroundings, noting insects flying in the immediate vicinity of the nest as well as persons passing along a nearby road. The wings were stretched frequently.

The larger of the two young was seen to fan its wings for the first time on the 19th



Fig. 13. Young Allen Hummingbirds at 21 days of age. The larger bird, perched on the rim of the nest, left the following day; June 17, 1938.

day, and on the 20th day it was seen to perch at times on the rim of the nest. On the 21st day this individual spent much time on the rim of the nest and fanned its wings frequently. Occasionally it would stretch its neck and extend its tongue out to touch surrounding leaves.

On the morning of the 22nd day the larger bird was seen to spend most of the time perched on the rim of the nest. No remnants of down were now apparent even on the rump. The bird was present at 1:15 p.m., but when the nest was next examined at 4:00 p.m. only the smaller of the two young remained. The young that had left was not to be seen in the vicinity.

On the 24th day the remaining young hummingbird was seen to behave in a manner similar to the larger individual the day before it left the nest. Much time was spent perched on the rim of the nest and the wings were fanned frequently. The parent was seen getting food and feeding this young often, and from her behavior it appeared improbable that she was still feeding the individual that had left two days previously.

At 9:35 a.m. on the 25th day the remaining young hummingbird was observed sitting in the cup of the nest. At 9:40 a.m., when next seen, it was perched on a branch three feet distant from the nest. The female was noted poised a few feet away. The young was then observed to vibrate its wings several times, once lifting its body up and merely holding on to the branch with one foot. During the ensuing 15 minutes the female was seen to feed the young twice. At 10:05 a.m. the writer reached out with a pole to see what would occur if the bird were prodded. When the pole came within an inch of the young it rose in the air, giving the same low call as the female used in approaching the nest, flew through an opening in the foliage of the tree, then flew down over a roadway and disappeared from sight in a clump of trees. Although careful observations were made in this area during the afternoon, the young was not definitely seen again.

In summary, observations were made upon a single Allen Hummingbird nest over a period of 47 days. The incubation period in this instance was found to be 15 days. The female obtained food principally during the morning hours. A male, thought to be the mate of the nesting female, was frequently seen in the vicinity of the nest tree during incubation and was tolerated to some extent by the female. Brooding was carried on by the female during the first week, then tapered off rather abruptly, practically ceasing by the 12th day. The decrease in time spent in brooding was correlated with an increase in time devoted to obtaining food. Juvenal feathers first appeared on the dorsal body tracts of the larger of the two young on the 7th day. The eyes of the young did not open until the 12th and 13th days. Growth appeared to take place more rapidly from the 12th day on. The young left the nest on the 22nd and 25th days, respectively, after hatching.

*California Academy of Sciences, San Francisco, California, September 29, 1938.*

AN UNRECOGNIZED RACE OF MURRELET ON THE PACIFIC COAST  
OF NORTH AMERICA

WITH THREE ILLUSTRATIONS

By J. ELTON GREEN and LEE W. ARNOLD

On July 13, 1937, J. Elton Green landed with a party on Outer Guadalupe Island, which is one of three small islands (known respectively as Outer, Middle and Inner) lying off the south point of Guadalupe Island, Mexico. The outer island appears to be the crater of an extinct volcano, and has steep slopes full of crevices and pot-holes. Here he collected two sets of eggs of the Xantus Murrelet and an incubating bird (no. 17668, S.D.S.N.H.). Having previously taken murrelets upon a number of islands both on the Pacific coast and in the Gulf of California, he was struck by the unusual head markings of the Guadalupe specimen, with the white of the underparts extending up the side of the head so as to include the eyes. The bird also showed a tendency toward graying around the ear coverts between the white and the slaty-black back.

Later, when this Guadalupe specimen was compared with the series of murrelets in the collection of the San Diego Society of Natural History, it was found that these characters existed in only two other specimens, each of which was a Guadalupe breeding bird. It was then observed that the Guadalupe birds compared perfectly with the original description of *Endomychura hypoleuca* (Xantus), which appeared, under the name *Brachyramphus hypoleucus*, in the Proc. Acad. Nat. Sci., Phila., Nov., 1859, p. 299, and contained the wording: "the entire underparts, including tail coverts and inside of the wings, pure white, *this color extending on the sides of the head so as to include the eyes.*" [Italics ours.] This description fitted only the Guadalupe breeding birds, not those collected from other Pacific coast islands.

With this information at hand, other collections were consulted. Of approximately forty murrelets examined by Green in the California Museum of Vertebrate Zoology, no Guadalupe specimens were found and also none with the "white of the underparts including the eyes." In the California Academy of Sciences collection, only two birds showed the white eye-area, these being both Guadalupe specimens; these were borrowed for comparison. Other examples of murrelets were generously loaned by the Carnegie Museum of Pittsburgh, the Harvard Museum of Comparative Zoology, the Santa Barbara Museum of Natural History, E. N. Harrison, and L. M. Huey.

Through the courtesy of the U. S. National Museum, a photograph of the type specimen of *Endomychura hypoleuca* (no. 13046, U.S.N.M.), collected by Xantus "14 miles off the coast of Cape San Lucas, Lower California, Mexico," July 14, 1859, and a skin of another murrelet (no. 66618, U.S.N.M.), also collected by Xantus at San José, Lower California, Mexico, in March, 1860, were procured. The label does not identify this last locality more closely; it is probably San José del Cabo. Both of these specimens show the white around the eyes, and, in support of our theory, we can only assume that they were wanderers from Guadalupe Island.

Ridgway, in "The Birds of North and Middle America" (Bull. 50, U. S. Nat. Mus., part 8, 1919, p. 752), states, with a question mark, that the winter plumage of Xantus Murrelet is "similar to the summer plumage, but with white on sides of head involving most of the loreal, suborbital, and auricular regions." His question may have been raised by the plumage of Xantus' March bird, but it can have no bearing on the type specimen of *hypoleuca*, which was a summer bird, collected on July 14. That the whiteness of the loreal, suborbital, and auricular regions is not a winter color phase is proved by the fact that it occurs in every breeding murrelet from Guadalupe Island

that is known to us. All the adult specimens showing this character that we have been able to locate are included in figure 14, printed herewith.

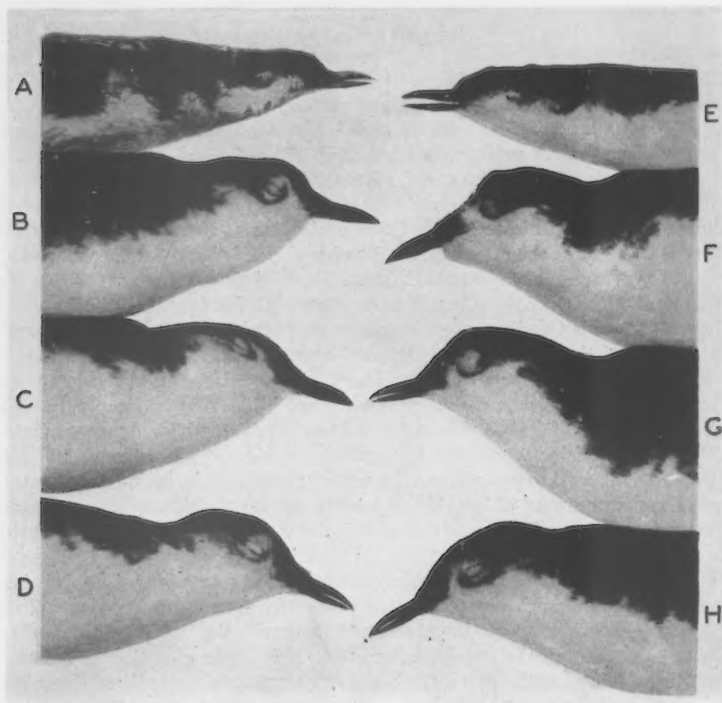


Fig. 14. Murrelets showing characteristic white "eye-area" of Xantus' type: A. 13046, U.S.N.M., ♀, type of *Endomychura hypoleuca* (Xantus), 14 miles off coast of Cape San Lucas, Lower California, Mexico, July 14, 1859 (from a photograph); B. 28057, C.A.S., ♂, Guadalupe I., Lower Calif., April 19, 1925; C. 28056, C.A.S., ♂, Guadalupe I., Lower Calif., April 19, 1925; D. Collection Ed. N. Harrison, Encinitas, Calif., ♀, Guadalupe I., Lower Calif., April 6, 1938; E. 66618, U.S.N.M., ♀, San Jose, Lower Calif., March, 1860, J. Xantus coll.; F. 38, S.D.S.N.H., ♂, Guadalupe I., Lower Calif., May 18, 1892; G. 8867, S.D.S.N.H., ♂, Guadalupe I., Lower Calif., July 13, 1923; H. 17668, S.D.S.N.H., ♀, Guadalupe I., Lower Calif., July 13, 1937.

The difference between Guadalupe breeding murrelets and those from other Pacific coast nesting stations is evident even in specimens of the downy young. In figure 15 is shown a group of six young. Bird A is the only Guadalupe specimen, and quite conformably it is the only bird with the white touching the eye. Birds B and C, which were collected on the San Benito Islands off the coast of Lower California, are very similar to D and E, taken on Los Coronados Islands, and do not show the Guadalupe characteristic. Bird F is a downy specimen of *Endomychura craveri*, which exhibits the same tendency for the dark color to come down on the sides of the neck as it does in the adult *craveri*.

Among the specimens borrowed from the Harvard Museum of Comparative Zoology is one (no. 305512) bearing the label: "*Brachyramphus hypoleucus* ♀, near Guadalupe Isl., June 27, 1906. Coll. of John E. Thayer." Examination of this bird shows it to bear the characteristics of *Endomychura craveri*, rather than those of *E. hypoleuca*. The

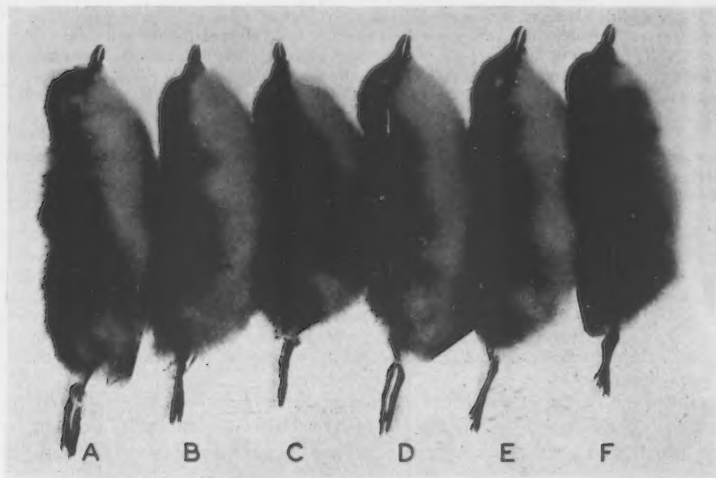


Fig. 15. Downy young murrelets: A. 10687, S.D.S.N.H., Guadalupe I., Lower Calif.; B. 22956, Carnegie Mus., San Benito Is., Lower Calif.; C. 22955, Carnegie Mus., San Benito Is., Lower Calif.; D. 10682, S.D.S.N.H., Los Coronados Is., Lower Calif.; E. 10681, S.D.S.N.H., Los Coronados Is., Lower Calif.; F. 9797, S.D.S.N.H., George's Island, Gulf of Calif., Sonora.

migrations of *E. craveri*, which breeds in the Gulf of California, are not fully known; but, after nesting, it occurs on the Pacific Ocean. In the collection of L. M. Huey is a specimen (no. 235) taken off San Diego, California, as early as August 13 (1914).

Because of the consistency of the "white eye-area" character in all the Guadalupe breeding birds we have examined and in the two birds taken by Xantus farther south on the open ocean, and the absence of it in the rest of the group, regardless of sex or season, we consider that there should be a separation between the two. However, we do not feel that our findings have enough bearing on *Endomychura craveri* to affect that species. Perhaps a closer tie between *E. hypoleuca* and *E. craveri* will be discovered in the future, but due to lack of material we can only speculate as to the possibilities. We therefore believe that the new form should be made a subspecies of *hypoleuca*. The original murrelet, as described by John Xantus, is then the Guadalupe bird and its name becomes *Endomychura hypoleuca hypoleuca*.

The specimen we are choosing for the type was taken from its nest on Anacapa Island, California, on May 16, 1938. This bird and two others were secured while the authors were on a collecting trip on the yacht of the late Robert P. Scripps of San Diego. It seems fitting that we should name the new form in honor of this man who did so much to further interest in Pacific coast science, and we therefore designate it

➤ *Endomychura hypoleuca scrippsi*, new subspecies. Scripps Murrelet.

*Type*.—Male adult, no. 17934, coll. San Diego Society of Natural History; Anacapa Island, California, May 16, 1938; collected by J. Elton Green, original no. 4105.

*Description of type*.—Entire upperparts, including loreal, suborbital, and auricular regions so as to include eyes, slaty-black or deep slate-gray; primaries and upper wing coverts slaty-black with brownish tinge; a narrow white crescentic mark beneath lower eyelid and a corresponding mark above upper eyelid; entire underside except outer portions of sides and flanks pure white, white of underparts not touching eye; outer portions of sides and flanks slate-gray with some bicolored black and white feathers at junction between black and white regions; under wing coverts pure white; inner webs of primaries grayish-white passing into gray distally and toward shafts; bill black.

*Subspecific characters*.—As compared with *Endomychura hypoleuca hypoleuca*, loreal, suborbital, and auricular regions slaty-black instead of white.

*Range*.—Resident along the coasts of California and western Lower California; known to breed on coastal islands from Anacapa Island to Natividad Island. Winters as far north as Point Arena, Mendocino County, California.

*Measurements of type*.—Length of closed wing, 111.0 mm.; tail, 32.0; tarsus, 23.5; middle toe (without claw), 22.8; exposed culmen, 18.7.

*Remarks*.—In making this study of murrelets we compared the measurements of over 200 birds of the genus, hoping to find some correlation or overlapping. Using tenths of millimeters, we found that the largest birds were from the north, those of the Gulf of California the smallest, and the Guadalupe birds tended to range near the center of the scale. However, we did not find enough of definite significance to influence the present study. It is known that the bill of *craveri* is comparatively long and slender, and that of *hypoleuca* comparatively short and heavy. But between the subspecies of *hypoleuca* the differences are not diagnostic. A general comparison of the adults of the three murrelets is shown in figure 16.

In thus limiting the known breeding ground of *Endomychura hypoleuca hypoleuca* (Xantus) to Guadalupe Island, it may be of interest to state our belief that the future of this form may depend on its success in nesting upon the small islands off Guadalupe,

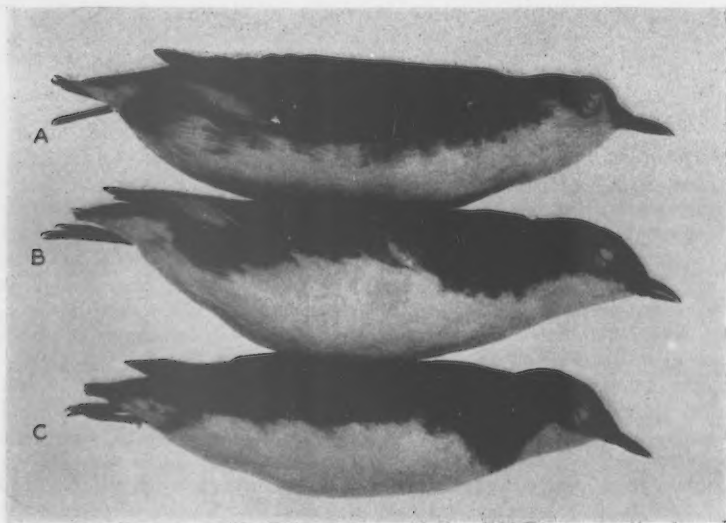


Fig. 16. Specimens of the three murrelets, selected to show characteristic plumage differences: A. *Endomychura hypoleuca hypoleuca*, no. 17668, S.D.S.N.H.; B. *Endomychura hypoleuca scrippsi* (type), no. 17934, S.D.S.N.H.; C. *Endomychura craveri* (showing maximum extension of dark collar), no. 15154, S.D.S.N.H.

inasmuch as the main island is now overrun with introduced domestic cats. On his 1937 visit, Green found no evidence of cats on Outer Guadalupe Island. He did, however, find a surprising number of discarded murrelet eggs, such as he has never seen elsewhere, and which he interpreted as an overcrowded condition of the nesting ground. Some of these eggs were broken or nicked, but just as many seemed unharmed, with the exception of showing that they had been exposed to the weather a varying number of seasons.

A rough estimate of these discarded eggs on the west slope alone would be over one hundred in an area of about 2500 square yards. As many as seven old eggs were found in one crevice, while groups of two and three were common. Some of these eggs were inside cavities while others were just outside and below the openings from which they had rolled. Almost no eggs were in the nesting cavities. The concentration of these birds on this island seemingly presents a vital problem in adequate nesting facilities when one considers the available nesting area on the main island before cats were introduced. Fortunately, due to the difficulty of landing, this outer island enjoys comparative seclusion from disturbance by man.

In closing, we wish to thank the individuals and the representatives of the museums previously named for the use of specimens; in addition, we thank Dr. Joseph Grinnell for his helpful advice, and Mr. Clinton G. Abbott for his interest and assistance. To Captain G. Allan Hancock we are indebted for the opportunity to land on Outer Guadalupe Island, and to Mr. F. S. Rogers of the San Diego Museum, for making the excellent photographs used for illustrations.

*San Diego Society of Natural History, San Diego, California, October 3, 1938.*

## FROM FIELD AND STUDY

**The California Thrasher as a Mimic.**—The reading of Dr. Loye Miller's informative discussion (Condor, vol. 40, 1938, pp. 216-219) of the mimetic activities of the mockingbird inspires the comment that the California Thrasher (*Toxostoma redivivum*) seldom receives due credit for his abilities in that direction. Probably the personal observations of others lead to a different conclusion, but it has seemed to me that it is *Toxostoma* rather than *Mimus* that really deserves the title of "mockingbird." Supplementing Dr. Miller's statement that "Certain mimetic notes are heard only in the area or at the season when the imitated species is present," it may be said that the thrasher, at least, seems able to remember them for a considerable time. Upon hearing the familiar and unmistakable notes of the male Bullock Oriole here at Azusa in midwinter I have found their author to be a thrasher. Late one summer, a thrasher's song included the call of a robin, a species which is an irregular winter visitant here; this, however, might more easily have been an accidental resemblance.

The most impressive example of mimicry which I have heard from the thrasher was an excellent imitation of the wail of a coyote. So perfect was the inflection that, had not the plaintive howls fitted neatly into the bird's song, it would have been hard to believe that they did not emanate from a coyote in the distance. The thrasher did not, however, attempt to reproduce the series of barks which ordinarily precedes the wailing note.—ROBERT S. WOODS, Azusa, California, October 3, 1938.

**A Rattlesnake Kills a California Quail.**—While checking over reports from several wildlife refuges under the supervision of the United States Biological Survey, I became interested in some notes concerning an encounter between a rattlesnake and a California Quail (*Lophortyx californica*) contained in the report of C. G. Fairchild, assistant refuge manager at the Tule Lake Wildlife Refuge, Siskiyou County, California. Mr. Fairchild is a careful and conscientious observer, and I believe his observations should be put on record. The substance of his report is as follows:

On July 26, 1938, a young California Quail was seen to fly under a bush at the Biological Survey headquarters. An enrollee of Camp Tule Lake B. F. 3 was approaching the bush to get a better view when he heard the buzz of a rattlesnake. Upon investigation the quail was found lying in a paralyzed condition beside the rattler; it died within 15 minutes. The snake was 2½ feet long and had six rattles. An autopsy was made and fang marks, surrounded by characteristic discoloration, were noted on the lumbar region. The antagonistic muscles of the legs were unequally paralyzed, and the heart was found to have stopped in diastole. These conditions indicate that the poison had a rapid lethal effect; otherwise the bird would have escaped the snake after being struck, unless the fangs were held in the wound until the quail was too weak to struggle.

The California Quail (*Lophortyx californica*) is a common permanent resident in the Tule Lake region, and rattlesnakes frequent the same kind of cover in considerable numbers. Additional studies of the relationship between these two species in this arid region are much needed.—STANLEY G. JEWETT, Portland, Oregon, September 28, 1938.

**New Bird Records for Nevada.**—The influence of Lake Mead upon the bird life of southern Nevada has already become apparent. During the past few months the following bird species, heretofore unrecorded in Nevada, have been observed:

*Anser albifrons albifrons*. White-fronted Goose. A lone individual was observed on the lake near the site of St. Thomas on May 6, 1938. It was in the company of a large number of teal.

*Larus philadelphia*. Bonaparte Gull. This species of gull was common along the lake shore near the site of St. Thomas on May 7, 1938. The birds were scattered along the shore in the company of Forster Terns.

*Sterna antillarum*. Least Tern. Nine of these terns were observed near the site of St. Thomas on May 7, 1938. One month later, on June 6, a single individual was seen flying along the lake shore at Hemenway Wash, below Boulder City.

It is believed that the presence of Lake Mead will attract other species to southern Nevada that are not recorded from the State at the present time.—RUSSELL K. GRATER, Boulder City, Nevada, September 15, 1938.

**The Form and Pigmentation of a Supernumerary Secondary of a Flicker.**—While examining a Red-shafted Flicker (*Colaptes cafer collaris*) taken last spring, I found an extra secondary present in one wing. The bird (F. H. T. no. 459) was an adult female captured alive at Davis,

California, on March 5, 1938. It was brought to Berkeley and kept in captivity, where it died on March 25. The extra feather was not discovered until the skin was being prepared.

This supernumerary feather lies between the seventh and eighth secondaries of the right wing, arising somewhat nearer the base of the former and about one millimeter ventral to the plane of the normal secondaries. The extra feather is accommodated between secondaries 7 and 8 in a two-millimeter space between their shafts where they emerge from the skin; normally shafts of adjacent secondaries nearly or quite touch each other. This accommodation apparently is made possible by a pushing apart of 7 and 8, resulting, in the mature feathers, in a distally directed bowing of the basal portion of the shaft of the former and a slight straightening of that of the latter. The base of the extra feather forms a slightly smaller angle with that of 8 than with that of 7. Both with the wing closed and with it open, the supernumerary feather apparently fitted in well with the rest of the series of secondaries.

The shape of the feather is similar to that of the seventh secondary, which is less rounded at the end than the eighth, but its sides are more nearly parallel and the tip more nearly square-cut. The shaft of this extra feather is somewhat curved, like normal seventh and eighth secondaries. Though mature, its size is small, as shown in the following table:

	Length (skin to tip)	Greatest width	Greatest width of shaft
Secondary 7 . . . . .	96.0 mm.	24.0 mm.	1.6 mm.
Supernumerary secondary . . . . .	67.5	19.0	1.1
Secondary 8 . . . . .	90.5	25.5	1.5

The pigmentation also is abnormal and of some interest. In the remiges of *Colaptes cafer collaris* two classes of pigment are present, carotenoid and melanin. The orange-red carotenoid occurs normally in the shaft and rami, giving the under surface of the feather its characteristic orange-red color. In the supernumerary feather this pigment is typical in amount and distribution. The melanins of the normal feather appear to be two, a brown and a black. These may be different stages in the oxidation of the chromagen, or, their color difference may be related to differences in the physical conditions of the pigment. The melanins in the normal feather are so distributed as to form a very dark brown, almost black, central part, from which dark bars extend to the margin, while between the bars are light brown areas. The bars do not reach the feather margin on the inner vane, and this margin is white with a pink flush as a result of the absence of melanin and the presence of carotenoid-colored rami and colorless barbules. In the supernumerary feather there is no continuous melanized area along the rhachis. Instead, each vane has a series of dark brown spots. The three distal spots on each side reach the rhachis, but the remaining one on the inner vane lies 0.3 mm. from the rhachis, and on the outer vane four spots merge to form a longitudinal band. The limits of the spots in this band can be discerned, though the intervening areas are almost as heavily pigmented. There is a light deposition of brown pigment between the three distal spots on the outer vane but none between the joined spots and the rhachis.

Microscopic examination of individual barbs of a normal feather and of the supernumerary one shows that in the dark brown areas there are heavy deposits of both brown and black melanins. The light brown areas contain the same pigments, but the black melanin is much more restricted, being confined to the pennula and flanges of the distal barbules; brown pigment is present here only in light amounts. The white portions of the feathers contain no melanin.

It will thus be seen that there is no difference between the supernumerary and a normal feather in kinds of pigments present; the difference comes in the extent of the melanized areas. The presence of a longitudinal band of color (melanin) separated from both the feather margin and the rhachis by non-melanized areas, as occurs in this extra secondary, is a much less common phenomenon in feathers than colored areas immediately beside the rhachis. Presumably, the basal regions of the barbs were, for some reason, not susceptible to melanization during their formation, whereas in the majority of feathers these portions seem to be most susceptible. This uncommon kind of pigmentation might be explained on the basis of such differential gradient functions as have been hypothesized recently by Fraps (*Physiol. Zool.*, vol. 11, 1938, pp.187-201). However, it would be necessary to postulate a condition inhibiting normal deposition of melanin instead of a pigmentation alternative to that of the black and brown melanin. The actual mechanism of the deposition of melanin and the effects of modifying factors are still not completely known, however. Abnormalities, such as this supernumerary secondary, may provide information for the formulation and testing of theories in regard to the processes involved. Sometimes in biology the abnormal condition assists in elucidation of the normal by throwing the latter and its causes into relief, as it were.

One wonders what the origin of this extra feather was. Its position indicates that it may have been formed by a papilla arising as an offshoot of that of secondary 7. It is unfortunate that the

feather was discovered too late to make histological preparations. It would be interesting to know whether this is a condition of the one year only or whether an extra feather had been present in the same position since the acquisition of juvenal plumage by the bird.

To summarize, there occurs in this female flicker a supernumerary feather lying between the seventh and eighth secondaries of one wing. It is smaller than either of the adjacent ones and slightly different in shape. The lipochrome pigmentation is normal, but the melanized areas are much restricted and somewhat unusual in pattern.—FREDERICK H. TEST, *Museum of Vertebrate Zoology, Berkeley, California, October 7, 1938.*

**A Prehistoric Record of Holboell Grebe in Nevada.**—A small collection of bones from Lovelock Cave, in west-central Nevada, was recently sent to me for identification by Mr. Robert F. Heizer of the University of California. The cave is located in a limestone outcrop on a high cliff in the Humboldt Mountains, overlooking the now dry Lake Humboldt. The presence of old beach lines along the mountains, and the occurrence of lake gravels on the floor of Lovelock Cave itself, indicate that this cave was originally formed by the wave action of the now extinct Lake Lahontan. The deposits, containing bones and many Indian objects, apparently represent an accumulation since the recession of that ancient lake. According to Loud and Harrington (Univ. Calif. Publ. Amer. Arch. and Ethn., vol. 25, 1929, pp. 120-122) in their description of the excavations of 1912 and 1924, the age of the earliest deposits is tentatively estimated at around four thousand years. At all events there is nothing to indicate geologic antiquity of the bones.

Among the 150 identifiable bird bones from Mr. Heizer's 1938 excavations are two which unmistakably are those of the Holboell Grebe (*Colymbus grisegena holboellii*), a species for which I find no previous record in Nevada.

The characters which distinguish these specimens from *Aechmophorus occidentalis*, the large grebe at present recorded from Nevada, are as follows:

**Tarsometatarsus.**—(1) Shorter and stouter than *A. occidentalis* (length, *C. grisegena* 61-64 mm., *A. occidentalis* 72-77.5 mm.; breadth of shaft, 3.3-3.7 mm. and 3.2-3.5 mm., respectively. (2) Height of facet for metatarsal 1 greater than in *Aechmophorus* (distance from top of facet to tip of median trochlea, *C. grisegena* 21-22.5 mm., *A. occidentalis* 20.1-22.2 mm.; ratio of this distance to length of bone, 35 per cent in *C. grisegena* and 28 per cent in *A. occidentalis*).

**Femur.**—(1) Distal end: well-marked ridge connecting tubercle above popliteal area with external condyle; ridge absent in *Aechmophorus*. (2) Proximal end: external contour of trochanter recedes slightly inward proximally in *C. grisegena*; more outwardly flared in *Aechmophorus*.

*Aechmophorus*, *Podilymbus* and one species of small *Colymbus* are also represented in the cave specimens. The remainder of the birds include loon, cormorant, night heron, goose, ducks, coot, shorebirds, grouse, pigeon, owl and corvids. With the exception of two gulls, all are of species recorded by Linsdale in his "Birds of Nevada." Linsdale lists only two species of gulls, *L. californicus* and *L. delawarensis*. In addition to several specimens of *L. californicus*, the cave material includes two bones whose size precludes the possibility of assignment to either of these species. One agrees in size with *L. occidentalis*, the other with *L. pipixcan*.—HILDEGARDE HOWARD, *Los Angeles Museum, Los Angeles, California, August 22, 1938.*

**Notes on the Distribution of Sooty Shearwater, White Pelican, and Cormorants in California.**—*Puffinus griseus*. Sooty Shearwater. In summer of 1925, first observed on San Francisco Bay off Alcatraz Island, July 18, a hundred or more birds. Noted frequently in same vicinity and numbers during ensuing month and at the same season in other years.

*Pelecanus erythrorhynchos*. White Pelican. Several seen June 13, 1925, on ponds bordering Butte Creek, west of Marysville Buttes, Sutter County. A local resident stated that they nested on a sandbar at the edge of a lake to the westward. Visitors in appropriate season should investigate actual breeding, no report of which is known to me for the Sacramento Valley since Heermann's (Pac. R. R. Rept., vol. 10, 1859, p. 72).

None seen in vicinity of Los Baños, May 20-22, 1925, but recorded as abundant there June 21. The observation suggests breeding in the San Joaquin Valley, not recorded for many years (Goldman, Condor, vol. 10, 1908, p. 201).

This stately bird unfortunately is unprotected by California State or Federal law and many are shot by fishermen. Such persecution was noted in Honey Lake Valley, June 21, 1931, when three of five birds were killed. They were thought to be foraging visitors from the Pyramid Lake, Nevada, breeding colony and were shot on a slough inhabited by black bass, catfish and roughfish. Report of similar pelican depredations near Loyalton in Sierra Valley was communicated to the Division of Fish and Game in the same month. The birds were said to come from the direction of Pyramid Lake.

*Phalacrocorax auritus albociliatus*. Farallon Cormorant. More than 20 pairs bred for many years prior to about 1930 in willows bordering Sandborn Slough, near Butte Creek, 7 miles west of Pennington, Sutter County; last found nesting there June 13, 1925. Visits in 1931 (February 26 and May 4) revealed the colony to be deserted, and the keeper of the gun club on whose grounds it was located advised he had for years been systematically shooting the birds, as he liked fishing and considered them competitors.

Another nesting colony, of about 40 pairs on April 11, 1920, located in eucalyptus trees bordering Cut-off Slough, 4 miles south of Suisun, Solano County, has in the past six years been destroyed by fishermen. The great increase in numbers of bass anglers in this locality since 1930 bodes ill for preservation of the fish-eating birds of the marsh.

*Phalacrocorax penicillatus*. Brandt Cormorant. A rookery estimated to be composed of 300 pairs on March 14, 1937, is situated on Bird Rock, about 1000 feet offshore, a half mile south of Tomales Point, Marin County. The birds were commencing to lay on May 24, 1936, when my wife accompanied me to the rock which she had not visited for 18 years. She immediately remarked upon the great reduction in number of nests present. My own visits date from 1923, since when a steady dwindling in the numbers of nesting birds has been observed. Unfortunately, no exact nest counts were made until July 21, 1938, when 86 occupied nests were found on the main rock, 60 near its top on the ocean side and 26 on a slope to the leeward.

On all visits two colonies have been found similarly located, the smaller one always being on the mainland side. This year, for the first time, 15 nests were noted on a rock immediately south of the main one. The date is seemingly late for eggs, nearly two months after they were found in 1936, and it was clear that only a fraction of the adults present were attending nests in July, 1938. Probably continued depredations had forced the cormorants to abandon attempts at reproduction for the season. Persons frequently landing on the rock during the breeding season to gather abalones are the prime disturbers, men sometimes playfully indulging in egg fights, using cormorant eggs for missiles; but the Western Gulls (*Larus occidentalis occidentalis*), which also breed on the islet, are the more usual, though secondary, offenders. When undisturbed, by sheer force of numbers covering closely placed nests, cormorants are able to protect their eggs and young from the ever vigilant gulls. When humans land on the rock, the shyer cormorants leave their nests while the fearless gulls pillage them. Dr. Clarence Cottam accompanied me on the recent visit when we watched gulls swallowing young cormorants and breaking their eggs while we stood 30 feet distant.

*Phalacrocorax pelagicus resplendens*. Baird Cormorant. On June 1, 1917, Dr. B. W. Evermann took a number of sets of eggs of this species from nests on the steep sides of the Bird Rock mentioned above (specimens in California Academy of Sciences). In nearly annual visits since 1923, I have failed to find the birds nesting on the rock. In June, 1925, about 25 pairs bred on precipitous cliffs of the adjacent mainland, but they were not nesting there June 12, 1927, nor have they since been observed breeding locally, although adults have been in evidence on all trips in summer.—JAMES MOFFITT, *California Academy of Sciences, San Francisco, August 20, 1938.*

**Anthony Green Heron in the State of Washington.**—During the past twenty years there has been a gradual northward movement of the Anthony Green Heron (*Butorides virescens anthonyi*) west of the Cascade Mountains in Oregon. At present it can be regarded as a fairly common summer resident throughout the Willamette Valley, north to the Columbia River. So far as I know, this heron never has been recorded north of the Columbia River.

On May 31, 1938, while a passenger on the Northern Pacific Railway between Portland, Oregon, and Seattle, Washington, I saw and identified beyond reasonable doubt one of these birds as it flew low over the willows along the banks of the Columbia River, a few miles south of Kelso, Cowlitz County, Washington. *Butorides virescens anthonyi* now may be added to the birds known to occur in the State of Washington.—STANLEY G. JEWETT, *Portland, Oregon, September 27, 1938.*

**Another Specimen of Sooty Fox Sparrow from Southern California.**—In my list of the birds of southwestern California (Pac. Coast Avif. No. 21, 1933), the Sooty Fox Sparrow, *Passerella iliaca fuliginosa*, was placed in the hypothetical list, although Swarth (Univ. Calif. Publ. Zool., vol. 21, 1920, pp. 151–152) had reported a "non-typical" specimen taken at Bear Flat, San Gabriel Mountains, November 30, 1916. My reason for thus disposing of this form was a disinclination to include it on the strength of a single example, admittedly not typical.

On November 7, 1938, Miss Gloria Widmann brought me a fox sparrow that had been found dead in her garden in Los Angeles two days previously by her father, Berthold Widmann. The specimen, a female, was preserved as a skin and is now number 19373, Los Angeles Museum. A study of this bird convinces me that it must be referred to *P. i. fuliginosa*, although, like specimens

from various localities in California discussed by Swarth (*op. cit.*, pp. 149-150), it differs from a series of Vancouver Island birds in the L. B. Bishop collection in having a stubbier bill and slightly duller coloration. However, unlike Swarth's specimen, the under parts (including the lower tail-coverts) appear to be as dark as in some examples from Vancouver Island. The color of the back is darker than in any other known fox sparrow, though slightly duller than in Dr. Bishop's birds.—G. WILLETT, Los Angeles Museum, Los Angeles, California, November 16, 1938.

**The Breeding Leucostictes of the Wallowa Mountains, Oregon.**—The fauna of the Wallowa Mountains in northeastern Oregon resembles closely that of the Rocky Mountains of Idaho. An exception to this generalization is found, however, in the rosy finches. In central Idaho, the peculiar Black Rosy Finch (*Leucosticte atrata*) occurs, whereas the breeding birds of the isolated Wallowa alpine area are similar to the Gray-crowned Rosy Finch (*Leucosticte tephrocotis tephrocotis*) that breeds no closer than in the Glacier National Park region of northwestern Montana. Jewett (Condor, vol. 26, 1924, p. 79) was the first to report breeding *tephrocotis* from the Wallowa Mountains. On July 23, 1923, when he secured samples of this species, he also took a Black Rosy Finch which was found to have testes that "were not enlarged as in the *tephrocotis* specimens." It would seem clear that this particular Black Leucosticte was not breeding. Some possibility existed, however, that both *L. atrata* and *L. tephrocotis* might nest in these mountains and that the two forms might interbreed.

Considerable attention was given to the leucostictes in the Wallowa Mountains last summer while a party from the Museum of Vertebrate Zoology was collecting in that range. A series of 19 breeding birds was obtained by Ward C. Russell, Donald T. Tappe, Frederick H. Test and myself from two alpine localities on Eagle Cap and Elkhorn Peak at the headwaters of the Lostine River. All are of the species *tephrocotis*, and no birds that resembled *atrata* were seen. The breeding *tephrocotis* prove to be different in coloration from *L. t. tephrocotis* of the Canadian Rockies and merit recognition as a distinct race.

*Leucosticte tephrocotis wallowa*, new subspecies. Wallowa Rosy Finch.

**Type.**—Adult male, no. 73998, Mus. Vert. Zool.; 18 mi. S, 2 mi. E, Lostine, 8800 feet altitude (north face of Elkhorn Peak), Wallowa Mountains, Wallowa County, Oregon; July 14, 1938; testis 10 mm. in length; collected by Alden H. Miller; original number 3263.

**Subspecific characters.**—Similar to *L. t. tephrocotis*, but cinnamon brown of ventral surface duller and more sooty, the feathers bearing either dusky areas or dusky shaft streaks immediately distal to downy gray basal parts. Black throat area grades less abruptly into breast. Streaks of back somewhat darker and broader and feather margins distinctly more neutral brown, with less yellow and red-brown pigment.

**Range.**—Known to breed only in the Wallowa Mountains of Oregon. Winter range not as yet determined.

**Remarks.**—The series of *wallowa* has been compared with specimens of *L. t. tephrocotis* in the United States National Museum that were taken in July in the Jasper Park area of the Canadian Rockies and with birds from the vicinity of Bowron Lake, Cariboo District, British Columbia. The Jasper Park birds are strictly comparable with *wallowa* in point of wear. Differences in average measurements of wing, tail, bill and feet between *wallowa* and *L. t. tephrocotis* are slight and are without statistical significance.

*Wallowa* differs from *L. t. dawsoni* of the Sierra Nevada of California in slightly sootier underparts, and in much darker, less tawny dorsal surface. Some individuals of *wallowa* are almost indistinguishable from *dawsoni* ventrally, but the dark, broad dorsal stripes of *wallowa* are in no instance closely approximated in *dawsoni*. *Wallowa* differs from *dawsoni*, as does *L. t. tephrocotis*, in greater average depth of bill and in more pointed wing tip.

Since 1913, when Grinnell (Condor, vol. 15, pp. 76-79) named *dawsoni*, additional representatives of that race have come to hand. The color characters which he ascribed to *dawsoni* have been confirmed. But, the size differences between *dawsoni* and *L. t. tephrocotis* have broken down, except for bill depth, as shown in the following table of averages.

			Wing	Tail	Bill length from nostril	Bill depth	Tarsus
<i>L. t. tephrocotis</i>	♂	11	105.7 mm.	69.8 mm.	8.86 mm.	7.45 mm.	19.96 mm.
<i>L. t. wallowa</i>	♂	11	103.7	67.6	8.76	7.31	19.65
<i>L. t. dawsoni</i>	♂	38	105.6	70.0	8.79	6.93	19.15
<i>L. t. tephrocotis</i>	♀	8	100.8	66.9	8.80	7.66	19.29
<i>L. t. wallowa</i>	♀	9	98.9	65.4	8.91	7.23	19.60
<i>L. t. dawsoni</i>	♀	42	99.9	66.2	8.76	7.01	19.11

Examination of the frequency distribution of bill depth measurements shows that the differences in average of that dimension probably represent a true difference in average genetic constitution of *dawsoni* and *L. t. tephrocotis*. Depths in male *dawsoni* range from 6.4 to 7.5 mm. (chiefly 6.7 to 7.2), in *wallowa* from 7.1 to 7.6, and in *L. t. tephrocotis* from 7.2 to 7.8.

Grinnell (*loc. cit.*) showed that in *dawsoni* there were more individuals with a rounded type of wing than in *L. t. tephrocotis*. He classified wings according to the relative lengths of the three outer primaries, designating each type by a formula that consisted of the primary numbers in order of decreasing length. The four formulae in order of decreasing sharpness of the wing tip are: (1) 9-8-7, (2) 8-9-7, (3) 8-7-9, and (4) 7-8-9. Occurrence of these types in the material that I have examined is as follows:

	1	2	3	4
<i>L. t. tephrocotis</i>	9	5	2	0
<i>L. t. wallowa</i>	13	6	0	0
<i>L. t. dawsoni</i>	5	32	21	3

It may be seen that the occurrence of a larger proportion of round-winged types in *dawsoni* is substantiated, and that *wallowa* shows no intermediacy toward *dawsoni*.

The sooty coloration, which distinguishes *wallowa* from its conspecific relatives, may have something to do with *L. atrata*, even though the latter form does not breed in the Wallowa Mountains. It is likely that *wallowa* possesses just a few of those factors for dark pigmentation that produce the solid blackish body plumage of *atrata*. *Wallowa* is not the result of recent hybridization of *L. tephrocotis* and *atrata*, for if it were, coloration more or less typical of *atrata* should appear sporadically in it. The sooty coloration is relatively uniform in the race and in no instance has it been found completely lacking. Thus, although *wallowa* may have certain factors in common with *atrata* that were derived from some common ancestor or from some former hybridization, it is not actually an annectant population linking *atrata* and *L. tephrocotis*. The differences in coloration between *wallowa* and *atrata* are great and there is no evidence of any break-down at the present time of the isolation of the breeding populations of *atrata*. It is impossible to conclude from available evidence whether the isolation of *atrata* is physiologic as well as geographic.—ALDEN H. MILLER, *Museum of Vertebrate Zoology, Berkeley, California, November 28, 1938.*

**Linnet Nests in Hole in Tree.**—In the vicinity of Benicia I have found California Linnets (*Carduelis mexicanus frontalis*) using a variety of nesting sites. These sites may be in bushes or vines next to a house, on projections or woodwork about a building, in trees, on a beam under a bridge, or in wild artichokes (*Cynara*). This season, for the first time, I have found a pair of these birds nesting in a hole in a tree.

The tree was a small willow on the bank of a stream two miles southwest of Cordelia, Solano County, California. When I walked by this tree on May 26, 1938, the female flew from the hole which was well filled with dry grasses and which held four eggs. The cavity was about six feet from the ground and was about the size which might have been dug by a California Woodpecker; however, this hole appeared to have been formed by the breaking off of a dead limb at its base, which left an opening into the partly hollow interior of the trunk. On a later visit, June 5, there were young in the nest.—EMERSON A. STONER, *Benicia, California, September 3, 1938.*

**Waterfowl at Deep Springs Valley, Inyo County, California.**—During the spring of 1938, while living at Deep Springs Ranch, I enjoyed the opportunity of making bird observations both at the ranch and at Deep Springs Lake. Both are located, eight miles apart, on the floor of Deep Springs Valley, a typical desert valley, devoid of any large vegetation and completely surrounded by mountains some of which reach to over 11000 feet. The floor of the valley is comparatively flat and lies at an elevation of about 5000 feet in the Inyo Mountains of eastern California.

The water of Deep Springs Lake is highly charged with various salts and is barren of any important living organisms. Surrounding the saline lake on the north and east are numerous freshwater ponds, each separated by small hillocks and fed by artesian springs. The ponds abound with a tremendous fauna of shrimp, snails, relict fishes, and frogs. Deep Springs Lake and its surrounding ponds, and Deep Springs Ranch with its irrigation ditches, puddles, and reservoir provide ideal havens for a wealth of migratory waterfowl and shore birds, while Deep Springs Lake is an excellent breeding ground for several species.

My observations in the valley were greatly limited up until about the middle of March, when migration seemed well under way. Many ducks certainly wintered at Deep Springs Lake, though I was not able to discover their identities. In late February a fairly large flock of Redheads was

present at the lake and a few individuals put in their appearance at the ranch. The height of migration seemed to come about the 27th of March, at which time, with the help of Mr. Harrison Brown, I took a census covering about one-fourth of the total population. No less than 391 individual birds were counted, representing eleven species of waterfowl. By the first of May the number of waterfowl dropped off considerably over the March numbers and most of the birds left seemed to be breeding. A list of the species and their more important occurrences follows.

*Colymbus nigricollis californicus*. Eared Grebe. An adult bird spent the afternoon of May 24 in a puddle at Deep Springs Ranch.

*Podilymbus podiceps*. Pied-billed Grebe. A single bird was seen at the lake on May 17. On May 9, 1937, a bird settled on one of the watering troughs at the ranch.

*Pelecanus erythrorhynchos*. White Pelican. On April 13 a flock of 22 flew over the ranch.

*Egretta thula*. Snowy Egret. One was seen on May 11 in a grassy field north of the lake. On June 3 a pair was seen near an artesian sulphur spring on the north edge of the lake.

*Casmerodius albus egretta*. American Egret. On April 24 three were seen wading in the lake. Two more were seen on May 17.

*Nycticorax nycticorax hoactli*. Black-crowned Night Heron. A flock of seven was noted near one of the ponds north of the lake on May 17.

*Anas platyrhynchos*. Mallard. On May 8 a pair was seen at the lake.

*Mareca americana*. Baldpate. Three birds of this species were counted in the March 27 census.

*Dafila acuta*. Pintail. On March 27 there were probably more than 400 Pintails at the lake, 100 being actually counted. At this time this was the most abundant species at the lake. By May 8 only a few birds remained. A nest with nine eggs was discovered on the latter date in the tules bordering one of the ponds east of the lake. On May 12 this same nest was visited and a California gopher snake was discovered peacefully coiled in it and trying to devour the eggs. It is curious to note that the brooding female was on the nest and flushed but a brief moment before I discovered the snake; certainly an insufficient time had elapsed for the snake to enter and make itself so completely "at home." The only explanation, it seems, is that the mother bird was sitting on the snake! The reptile was taken away and later indications seemed to show that the brood was successfully reared.

*Nettion carolinense*. Green-winged Teal. Fifteen noted on the ponds to the east of the lake on March 27.

*Querquedula cyanoptera*. Cinnamon Teal. A common summer resident and migrant at Deep Springs Lake. On July 30, 1937, a dead Cinnamon Teal was found in an alfalfa field at Deep Springs Ranch. Eighteen birds were counted on March 27. By May 8 this was the most common species at the lake, and it remained abundant into the summer. On May 1 a pair was located on a swimming hole at the ranch. One bird was found on May 12, wading in an overflow ditch about one mile south of the ranch.

*Spatula clypeata*. Shoveller. Six counted at the lake on March 27 and one female and two males noted on May 12.

*Nyroca americana*. Red-head. On February 20 a flock of about fifty was on a pond to the east of the lake. On February 22 a few were seen on an irrigation ditch at the ranch. Twenty-one males were counted in the March 27 census. Still present, though uncommon, at the lake in June.

*Nyroca affinis*. Lesser Scaup Duck. Six birds, probably of this species, were counted on March 27. On June 3 a single bird was noted on a pond to the north of the lake.

*Nyroca collaris*. Ring-necked Duck. On March 27 there were six birds of this species identified on one of the ponds to the east of the lake. One bird was noted on April 24 at the lake.

*Erismatura jamaicensis rubida*. Ruddy Duck. Eight birds on March 27. This species became steadily more and more abundant and finally was the most common duck at the lake by the first of June.

*Porzana carolina*. Sora Rail. March 27, two birds, in tules around pond north of lake. One bird noted in same place on May 8.

*Fulica americana*. Coot. February 13, common at the lake. On March 27 about 200 birds of this species were counted, and from then on it remained abundant, breeding commonly during the summer.

*Oryechus vociferus*. Killdeer. On March 23 a single Killdeer followed a plow at the ranch, eating the worms that were unearthed in the freshly turned ground. The same bird continued doing this for three or four days after. On May 12 a single bird was seen at the lake, and on May 24 another was seen at the ranch.

*Capella delicata*. Wilson Snipe. On February 20 several snipe were flushed from the grass east of the lake. On March 7 one bird was seen at the ranch. On April 14 one was flushed near the boarding house at the ranch where someone remarked that it looked like an overgrown hummingbird! Several other occurrences are on record for this species during the spring months.

*Actitis macularia*. Spotted Sandpiper. One seen along a road at the ranch on April 21. Eight birds found in an irrigation ditch at the ranch on April 29. On May 8 several seen at the lake. About the middle of May the species was common at both the lake and the ranch. The last one seen during the spring was at the ranch on May 24.

*Tringa solitaria*. Solitary Sandpiper. A single bird of this species was closely observed at the ranch during the morning of May 7.

*Pisobia minutilla*. Least Sandpiper. Ten birds were counted on April 24, feeding on a bank at the lake. Two were seen on May 12 at the lake.

*Recurvirostra americana*. Avocet. A flock of eight Avocets spent the morning of May 5 about the ranch. Several were noted at the lake on May 8. On May 12 the species was abundant at the lake and one nest was found containing three eggs. Remained common into the summer.

*Steganopus tricolor*. Wilson Phalarope. Noted as common on May 7 in the ponds surrounding the lake. On May 12 it was abundant in large flocks on both the lake and the surrounding ponds. Five days later not a single bird of this species could be found.

*Lobipes lobatus*. Northern Phalarope. On May 17 a flock of about 25 was noted on a pond north of the lake.—WILLIAM G. WEBB, *Eagle Rock, California, September 10, 1938.*

**Great Blue Heron Swimming.**—While it is probable that most birds can swim when occasion requires, it is a novelty to see any of the larger waders demonstrating this inherent ability of their own free will and choice.

In company with Dr. Irvin Rasmussen, Mr. Cecil Williams, and Mr. Lee Kay, the writer saw this feat accomplished by a Treganza Blue Heron (*Ardea herodias treganzai*) at Gunnison Island, Great Salt Lake, Utah, July 12, 1938. It is believed that the individual was a bird of the year and that it probably had been raised on this island, which is about one mile long and a half mile wide. As the island is 30 to 40 miles from a source of food, it is probable that the bird had never ventured far beyond the confines of its homeland. When our company approached, the bird took wing and flew in a semicircle over the mainland, alighting in the shallow brine some 30 yards from shore, whence it proceeded to walk into deeper water. On reaching water that was too deep for wading it began to swim with apparent ease and skill. It remained resting on the lake for about two hours, during which time it came much closer to shore, where we could easily observe it with binoculars. It was noted swimming in water that was probably not more than 6 or 8 inches deep. During this time its legs were held tightly against the body, but we could see that the feet were in motion. When, on one occasion, the writer approached the bird as it swam near shore, it promptly stood up and walked toward deeper water. More than half the length of the tarsus was then visible above the waterline. It is possible that the great buoyancy of this nearly saturated water was an inducement to swimming.—CLARENCE COTTAM, *United States Biological Survey, Washington, D. C., October 5, 1938.*

**The Amur Barn Swallow, a New Bird for North America.**—Mr. Paul Silook, an Eskimo collector at Gambell, St. Lawrence Island, has recently sent in to the United States National Museum an adult barn swallow which he obtained at his home. On examination this bird turns out to be a perfectly typical example of the Amur Barn Swallow, *Hirundo rustica gutturalis*. It has a broad blue-black pectoral band separating the deep reddish bay of the chin and throat from the very pale, whitish abdomen. Unfortunately, the specimen is somewhat mutilated, lacking the tail, and is accompanied by no data, other than the knowledge that it was taken at or near Gambell either in the spring or summer of 1938. The record recalls to mind the fact that O. J. Murie lists a specimen of barn swallow taken on St. Lawrence Island during the spring of 1934 (*in* Geist and Rainey, *Archaeological Excavations at Kukulik, St. Lawrence Island, Alaska, 1936 (actually 1937), Appendix V, p. 374*) under the name *Hirundo erythrogaster*. This is the only previous record of any barn swallow for the Island. In response to my request, Mr. Murie has kindly sent me his specimen for study, and I find that it also is *Hirundo rustica gutturalis*. It does not have the broad pectoral band of the Silook example but has some blue-black across the breast; it has the light underparts and dark throat, chin, and forehead characteristic of *gutturalis*.

It may be worthy of note that these two specimens are not of the northeast Siberian race, *tyleri*, as might be expected on geographic grounds, but of the more southern Amur-Ussuriland race. They, together with such other St. Lawrence records as *Anthus gustavi* and *Cuculus canorus bakeri*, suggest that when Asiatic birds stray over to St. Lawrence Island, they are not necessarily (or even usually) the forms of the adjacent mainland area. This causes one to wish for actual specimens of the Yellow Wagtail (*Budytes flavus*) from the Island. The species has been listed on the basis of Nelson's early observations, which have always been assumed to be referable to *B. f. alascentis*, but without proof (see Friedmann, *Proc. U. S. Nat. Mus.*, vol. 80, 1932, p. 30).—HERBERT FRIEDMANN, *United States National Museum, Washington, D. C., November 10, 1938.*

**Pacific Gull Color Banding Project.**—During the summer of 1938, the Western Bird-banding Association, with the purpose of studying gull migration and life history, was successful in placing distinctive colored bands (as well as the usual Survey bands) on 1800 nestling gulls at the following 7 colonies:

Colony	Color Combination	
	Right Leg	Left Leg
1. <i>N. Coronado Island, Mexico</i> (off San Diego, Calif.): 153 young Western Gulls ( <i>Larus occidentalis wymani</i> ) banded July 21, 1938, by Mrs. M. C. Sargent and H. David Michener.	Red Survey Red	
2. <i>Mono Lake, Calif.:</i> 510 young California Gulls ( <i>Larus californicus</i> ) banded July 12, 1938, by Walter Nichols.	Blue Survey	Blue
3. <i>Three Arch Island, Oregon:</i> 150 young Western Gulls ( <i>Larus occidentalis occidentalis</i> ) banded July 6, 1938, by Reed Ferris.	Survey	Red Blue
4. <i>Haystack Rock, Oregon:</i> 675 young Western Gulls ( <i>Larus occidentalis occidentalis</i> ) banded July 8 and 16, 1938, by Reed Ferris.	Blue	Red Survey
5. <i>Mittenatch Island, Gulf of Georgia, B. C.:</i> 85 young Glaucous-winged Gulls ( <i>Larus glaucescens</i> ) banded August 15, 1938, by Theed Pearse.	Yellow Survey	Yellow
6. <i>Yellow Island, Haro Straits, B. C.:</i> 149 young Glaucous-winged Gulls ( <i>Larus glaucescens</i> ) banded August 2, 1938, by Dennis Ashby.	Yellow Blue	Survey
7. <i>East Bay, Gambier Island, B. C.:</i> 75 young Glaucous-winged Gulls ( <i>Larus glaucescens</i> ) banded August 2, 1938, by Kenneth Alexander.	Yellow Survey	Blue

Since the value of this project will lie in adequate geographical coverage of the migratory area by competent observers, the cooperation of all bird students is welcomed in watching for these gulls. It should be remembered that during 1939 all these young gulls will have mottled gray plumage. If a bird is found dead, send the numbered aluminum Survey band to the Biological Survey, Washington, D. C. If a live gull is seen, it is not necessary to capture the bird or to identify the species. Merely observe *carefully* the color combination and report, with date, exact place, and your name, to any of the following.—REED FERRIS, *Beaver, Oregon*; G. D. SPROT, *Cobble Hill, B. C.*; MRS. M. C. SARGENT, *Scripps Institution, La Jolla, California*.

## NOTES AND NEWS

Because of the meeting of the American Ornithologists' Union in the San Francisco Bay region from June 19 to 23 of this year, it has been thought best to postpone the Annual Meeting of the Cooper Club until autumn. It may be necessary to arrange for a Business Meeting of the Club before that time, but no scientific sessions are contemplated. Club members in California are anxious to assure the success of this year's A.O.U. Meeting. Not since 1915, has the Union come to the Pacific coast, and we anticipate an excellent attendance of eastern members.—A. H. M.

Of exceptional import for bird preservationists is the article by Mr. R. A. Johnson (in *Wilson Bull.*, vol. 50, 1938, pp. 161-170, figs. 24-25) entitled "Predation of Gulls in Murre Colonies." The author's own direct observations were made in the Gulf of St. Lawrence where Black-backed Gulls and Atlantic Murres occupy nesting sites in common. These species are counterparts of the Western Gull and California Murre, observations upon which as associated on the Farallon Islands the author cites from Californian sources. The nature of Mr. Johnson's conclusions are indicated in part by the following statements of his: "So

long as man stays out of sight of the nesting murre and the population of the gulls is within reasonable limits, the gull gets for the most part only a scavenger's share of the murre eggs—mostly the abandoned ones. But, if the murre's vigil becomes weakened by any influence, such as disturbance, the former scavenger has little trouble in securing many eggs. . . . Gulls which have lost their eggs by accident, or because man has destroyed them as an attempt to control the gull population, do not appear to leave their nesting territory any earlier than those gulls which rear young. As a result of general commotion which they set up because of the loss of the first set of eggs, the fuss they make in rebuilding the nest, and the general lack of demands on their time which the feeding of young birds would preclude, they are, at times, more serious enemies to other nesting birds than individual pairs of gulls which are allowed to breed normally. . . . It is this unoccupied group of gulls that [Mr. Johnson says] I found were taking the greater portion of the unguarded murre eggs and newly hatched Eider ducklings." And further: ". . . By the very nature of the murre's responses to fear [which he fully describes], the gradual disappearance of that great Farallon breeding population nesting in a location exposed to gull damage was an inevitable consequence of the disturbance by human eggers." And of course there are many categories of human disturbers with objectives other than those of the old-time "eggers".—J. G.

We learn with deep regret of the death of Dr. John C. Phillips on November 14, 1938. A most effective and wise conservationist, he will be greatly missed in the high councils of wildlife protection. Dr. Phillips had been a member of the Cooper Club since 1911. He was especially well known for his excellent volumes on the "Natural History of the Ducks."—A. H. M.

"The California Woodpecker and I; a study in comparative zoology in which are set forth numerous facts and reflections by one of us about both of us", is the whimsical and explanatory title of a book by Professor William E. Ritter (University of California Press, Berkeley, xiii+340 pp., 28 figs. in text, 1938); excellent portraits of the two interesting subjects of this study are added. The author approaches the comparison of birds and men in a decidedly philosophical mood, figuratively picking up each item, examining it from every angle and looking through and beyond it. The comparison does not press far into technical detail, and much space is devoted to reflection upon the significance of elementary facts about the anatomy and physiology of birds and mammals. Philosophical discussions are difficult to evaluate and they appeal variously to readers of different tastes. To this reviewer, the

last two chapters, on the way of life in relation to mind and brain and on the author's personal outlook on nature, were especially pleasing. They admirably reflect the feeling of a true naturalist and the great satisfaction that comes to one who has lived with and knows the animal world. The first third of the book is chiefly about California Woodpeckers and deserves special attention here. Truly remarkable are the ways of life of this species. It has abandoned many of the customary instincts of woodpeckers, and gathers, stores and eats acorns in ways which are highly adaptive; yet in storing it does many things that reflect the rigidity of its instincts and the lack of thought. California Woodpeckers live in settlements. Territory is an affair of the settlement or community, not of males or of pairs. Nest-building, incubation and feeding of the young are community projects in which the participating individuals of both sexes appear to get along most amicably. The birds seem able to recognize types of oaks and spacings of trees which are specially suited to the conduct of community life. A better species for a naturalist to study can scarcely be imagined.—A. H. M.

The Bank Swallow seems likely the least numerous in aggregate numbers of any of the species of swallow occurring in California. Records of it in the ornithological literature for this state are fewest, even as appearing in the migrations. And authentically recorded sites of nesting colonies number not more than twelve all told; most of these records are for years long passed and for places now unfit for occupancy by a bird of such specialized nesting habits. Some of the older records, too, are dubious because of the chance of confusion in identity with the Rough-winged Swallow. The undersigned would be glad to receive from any Cooper Club member, definite information as to the location of any present nesting colony of Bank Swallows within the boundaries of California, with approximate number of birds comprising such colony. By "present" may be understood as meaning in 1937 or 1938.—J. GRINNELL, *Museum of Vertebrate Zoology, Berkeley, California.*

#### MINUTES OF COOPER CLUB MEETINGS

##### SOUTHERN DIVISION

SEPTEMBER.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held at the San Diego Zoo, Balboa Park, San Diego, on Sunday, September 24, 1938, at 1:15 p.m. Twenty-eight members and guests gathered around a large picnic table on the lawn beside the penguin pool for a short business meeting before making a tour of the zoo.

Upon unanimous vote of the members the reading of the minutes of the previous meeting

was dispensed with. President McCoy called upon Dr. Abbott to say a few words. Dr. Abbott greeted the out-of-town visitors and extended an invitation to all present to stop at his home after the meeting for refreshments. He then introduced Mrs. Benchley, Director of the Zoo. Mrs. Benchley called attention to three things in particular which she wanted the group to see: The recently acquired Monkey-eating Eagle; the Black-backed Bitterns, which, though not in captivity, remain around the aviary; and a similarly minded Wood Ibis which lingered on after the flock of twenty-seven wild ibises had left the park.

Mrs. Grace Sargent, of the Scripps Institution of Oceanography, made a brief announcement regarding the work of color-banding gulls, and distributed charts showing the types of bands used, with instructions as to whom to notify in case any gulls so banded should be observed.

At the conclusion of the business meeting, the members voted that thanks be extended to Mrs. Benchley for her hospitality to the Club, and Dr. Abbott was asked to convey the message to her.

With Mrs. Benchley and Mr. Gander as guides, the party then proceeded to visit the various bird cages, passing first to the magnificent raptor cage, containing South American and California condors, caracaras, and various eagles and hawks, thence along the trail bordered by small cages containing, respectively, Galapagos Hawks, California Condor, Fish Owls, Snowy Owls, Prairie Falcon, Duck Hawk, Turkey Vultures, two King Vultures in excellent plumage, Laughing Jackass, and Boatbill Heron. Another large aviary contained many different species, particularly of waterbirds. From here Mrs. Benchley took the group into a closed area in which birds not yet ready for exhibition are kept. Here the party was treated to a private view of the Monkey-eating Eagle, a magnificent bird, apparently in perfect health and in prime plumage. Mrs. Benchley explained that, because the bird is the only one in any American zoo, they are taking the utmost care to study its habits and establish the proper diet for it before venturing to put it before the public.

At this point the party disbanded. Later, members gathered informally at the home of Dr. and Mrs. Abbott for tea.

Adjourned.—HILDEGARDE HOWARD, *Secretary*.

#### NORTHERN DIVISION

SEPTEMBER.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, September 22, 1938, at 8:00 p.m., in Room 2503 Life Sciences Building, Berkeley, with President Emlen in the chair and fifty-four members and guests present. Minutes of the Northern Division for August were read, corrected, and approved. Min-

utes of the Southern Division were read. Names proposed for membership were: A. Sidney Hyde, 3997 Washington Street, San Francisco, by Alden H. Miller; Thomas Smith Kelly, 3rd, 1799 Euclid Avenue, Berkeley, by Seth B. Benson; Ronald Ward Smith, Museum of Vertebrate Zoology, Berkeley, by Frank Richardson.

Mr. E. L. Sumner, Sr., made an announcement regarding the program of gull banding on the Pacific coast.

Mrs. Kelly opened field reports with the statement that Avocets and Lesser Yellow-legs might be seen at Alameda. She had seen Northern Phalaropes on a small pool south of the main pool in the Berkeley Aquatic Park, and expressed the wish that the small pool might be preserved in its present condition as a valuable natural sanctuary, since the main pool has been so highly developed for boating. It was moved and carried that the secretary forward Mrs. Kelly's suggestion to the proper city officials. Mr. Laidlaw Williams had seen two Parasitic Jaegers at Moss Landing, Monterey County, August 7. Six Bonaparte Gulls at Moss Landing, September 8, were the first recorded for this season. Dates of arrival of birds at Carmel included the Townsend Warbler, September 8; Lincoln Sparrow, September 10; and Say Phoebe, September 12. A flock of 30 Tricolored Red-wings on September 10 was an unusual record for the Carmel region. Mr. Alden Miller had seen a shrike in Strawberry Canyon and said that he would be interested in further observations on that species, as it had not been seen there since 1927. Mr. Dyer commented on the fall singing of thrashers. Mr. Kinsey told of seeing a Road-runner on the north approach of the Golden Gate Bridge.

Mr. Albert Wolfson spoke on "Experimental Studies in Bird Migration." The causes of migration, including original causes in the geologic past and present stimulating factors, were considered. He reviewed the work of Rowan and others, who have attempted to determine experimentally the relation between annual external stimuli and the internal stimuli of the reproductive cycle in initiating migration. Mr. Wolfson's own experiments consisted in exposing a number of captive individuals of migratory races of the Oregon Junco to increased lighting comparable to that normally encountered during migration. These birds were released late in May with gonads in full breeding condition. Failure to observe any of these marked individuals for more than one day succeeding their release could lead only to the supposition that the migratory instinct must have been active independent of the phase of the reproductive cycle. Stimulating discussion, in which many members participated, followed the speaker's contribution.

Adjourned.—FRANCES CARTER, *Recording Secretary*.

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FOR SALE—A collection of about 1000 bird skins, over three hundred species, including Ivory-billed Woodpecker and other rare North American forms.—R. D. JENNINGS, *P. O. Box 204, Clinton, New Jersey.*

FOR SALE—We heartily recommend Mrs. Nice's new work on Song Sparrows. It is illustrated by many graphs and maps and has one color plate. There are 247 pages in all. The Cooper Club has a few copies that we offer for \$1.50, paper covers.—W. LEE CHAMBERS, *Business Manager, 2068 Escarp Drive, Eagle Rock, California.*

WANTED—Will pay reasonable price for Ivar Tidestrom's "Flora of Utah and Nevada," Contribution from U. S. National Herbarium vol. 25; and also for Miller and Allen's "The American Bats of the Genera *Myotis* and *Pizonyx*," U. S. National Museum Bulletin 144.—ROSS HARDY, *Dixie Junior College, Saint George, Utah.*

SYSTEMATISTS AND MORPHOLOGISTS—I am in a position to operate a clearing station for avian anatomical material. One hundred and fifty well-preserved formalin specimens of a representative series of American birds which form my collection are available to all investigators. Material in the form of preserved carcasses, entire birds, young, or embryos, will be accepted from field collectors and held for shipment to all who ask. Special virtue of the collection is that destruction of specimens by complete dissection is permitted, making possible investigations rarely possible on museum material. Inquiry is invited.—BERRY CAMPBELL, *University of Oklahoma School of Medicine, Oklahoma City, Oklahoma.*

FOR SALE—Complete file of *The Condor*, all in perfect shape. Current volume and several early Avifaunas. Price \$75.00.—W. P. STEINBECK, *611 Bristol Ave., Stockton, California.*

WANTED—An adult female Road-runner, to be released at my home here as consort for my resident, free-living male "Rhody", who has been unsuccessful for several years in attracting from the wilds a mate to share with him the many nests he builds here in hopeful anticipation. Bird must have been legally captured and held. Object: To fill gaps in my photo-monograph of Road-runner life history.—E. I. DYER, *40 Selborne Drive, Piedmont, California.*

**FOR SALE**  
**THE LAST CHANCE**

The Cooper Club has recently acquired a few sets of "Zoe." This publication was one of the earliest on the Pacific Coast to record new scientific facts; it started in 1890 and ran through 1900; five volumes in all were issued. A file of "Zoe" contains a wealth of papers by early California zoologists, and is very rare. A. W. Anthony, Walter E. Bryant, David Starr Jordan, W. Otto Emerson, Lyman Belding, Frank Stephens, Harry R. Taylor, J. G. Cooper and N. L. Britton were some of its contributors.

We offer these sets (complete except for the last issue, vol. V, no. 11, which was devoted entirely to botany) for \$5.00 plus postage. The entire amount realized from their sale will be placed in the Endowment Fund of the Cooper Ornithological Club.

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